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CARCINOMA OF THE PROSTATE

Therapy With Radioactive Colloidal Gold

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RADIOACTIVE colloidal gold (Au^{198}) offers a new method of therapy of carcinoma of the prostate for a large group of patients who cannot be treated by radical prostatectomy but who do not have distant metastases. In order to discuss this new therapeutic agent, it is first necessary that the classification of this neoplasm be considered. Carcinoma of the prostate may be divided into three groups according to the extent of disease as follows:

Group 1. Carcinoma confined entirely within the gland. Serum acid phosphatase normal. No regional or distant metastases.

Group 2. Carcinoma within the gland and with local extension beyond the gland. Serum acid phosphatase normal. No distant metastases.

Group 3. Carcinoma in the gland. Evidence of distant metastases as demonstrated by elevated serum acid phosphatase and/or osteoblastic metastases, pulmonary metastases, et cetera.

Of all patients with carcinoma of the prostate, about 10 per cent are in group 1, 40 per cent are in group 2, and 50 per cent are in group 3 when first discovered. Less than 10 per cent of patients with this disease are found early enough to benefit from surgical cure. In those patients comprising group 1, radical prostatectomy is the preferred method of treatment. Previously the remaining 90 per cent have been treated only by orchiectomy and estrogen therapy. Massive irradiation applied directly to the tumor by injection of Au^{198} offers the possibility of cure in a significant group of patients who are not treatable by other means.

Irradiation for prostatic carcinoma is not new. Young[1] demonstrated that carcinoma of this gland would respond to irradiation

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if adequate tumor doses were given. However, doses large enough to destroy the tumor caused excessive damage to the bladder and bowel. A means of massive irradiation without associated damage to normal tissue became possible through the work of Flocks and co-workers[2] in 1952, when they showed that, following direct injection of Au^{198} into the prostate, a definite regression of the tumor was observed.

Several large series from different centers have now been compiled. These series demonstrate that good results are attainable in at least half of the patients whose treatment previously had been only palliative. Although this article discusses a small series of 12 patients, the results are such that we believe more patients would be helped if such treatment were made more readily available.

This article presents our experience in the first 3 years of study. The cases included are intended only to emphasize that, although no definite cure was established, marked improvement occurred in all but one case.

RADIOACTIVE COLLOIDAL GOLD

Radioactive colloidal gold was chosen because its characteristics are particularly suitable for injection directly into the prostate.[2] Because of the colloidal nature of the material, Au^{198} does not undergo chemical reactions in the body. It is produced in the nuclear reactor by neutron bombardment of Au^{197}. Its half-life is 2.7 days, and it decays to a stable isotope of mercury by the emission of a beta particle of 0.97 Mev maximum energy giving off two gammas of 0.12 and 0.41 Mev. The therapeutic effect is produced by the beta particles whose maximum penetration in tissue is 3.8 mm. There is no detectable damage to surrounding tissue from the gamma rays. One microcurie destroyed in one gram of tissue produces 76 equivalent roentgens. The entire dose is delivered in about 11 days (5 half-lives).

It is received as a sterile pyrogen-free preparation from Abbott Laboratories in Oak Ridge, Tenn. One milliliter of epinephrine hydrochloride (1:10,000) and 150 units of hyaluronidase are added before dilution to final volume. Isotonic saline solution is used as the diluent to obtain the final volume of injectate. The volumes and specific activities in our series are shown in table 1. The vial is then placed in a shielded container for transportation to the operating room. The Au^{198} solution is a claret red liquid permitting ease of administration and relatively uniform distribution throughout the prostate.

SELECTION CRITERIA

The patients in group 2 meeting the criteria for treatment with radioactive colloidal gold have a gland containing one or more

TABLE 1. *Summary of Au[198] therapy for patients with carcinoma of prostate*

Case number	Number of injections	Date of injection	Route of injection	Estimated gland weight (grams)	Mc. of Au[198] injected	Volume of injectate (ml.)	Specific activity (mc./ml.)
1	1	18 Mar 1954	Suprapubic	45	48	12	4
2	2	12 Jul 1953	Suprapubic	40	75	20	3.75
		29 Jul 1954	Perineal	30	68	4.5	15
3	1	10 Oct 1953	Suprapubic	25	55	6	9.2
4	1	5 Aug 1954	Perineal	20	103	7	14.7
5	3	25 Nov 1953	Suprapubic	50	100	11	9.1
		10 Mar 1954	Perineal	20	55	7	9.5
		26 Oct 1954	Perineal	30	42	6	8
6	4	2 Sep 1953	Suprapubic	40	67.5	9	7.5
		28 Jan 1954	Perineal	30	60	4	15
		7 Oct 1954	Perineal	25	70	7	10
		27 Jan 1955	Perineal	20	50	5	10
7	2	27 Aug 1953	Suprapubic	75	114	8	14.3
		10 Feb 1954	Perineal	70	105	7	15
8	1	24 Jun 1954	Suprapubic	22	48	6.5	7.4
9	1	20 Jan 1955	Perineal	20	60	6	10
10	3	22 Oct 1953	Suprapubic	40	45	9	5
		18 Feb 1954	Perineal	30	80	8	10
		2 Sep 1954	Perineal	30	50	5	10
11	1	22 Sep 1953	Suprapubic	30	50	8	6.3
12	1	3 Feb 1955	Suprapubic	20	74	11	6.7

"stony" hard nodules and with local extension usually to the seminal vesicles, which normally are not palpable, thus resulting in a fixed hard prostate no longer completely removable. There is no roentgenographic evidence of metastasis, and the serum acid phosphatase is normal or very slightly elevated. In this group there is often evidence of minimal or moderate urinary obstruction; whereas urinary obstruction is rarely encountered in patients in group 1.[2]

The serum acid phosphatase level is considered important because an elevation usually indicates some spread of tumor even in the absence of roentgenographic evidence of metastasis.[3] This enzyme is also present in other tissues such as the liver and kidney, but for clinical purposes does not occur in increased amount except in prostatic carcinoma with metastasis. Although the prostatic component, alone, can be measured with recent, improved methods, our routine laboratory analysis in Bodansky or King-Armstrong units is a satisfactory measure of prostatic activity.

METHODS OF THERAPY

In group 2 patients, two approaches to the prostate for injection are available, the suprapubic and the perineal. For initial Au^{198} treatment the suprapubic approach is used because it offers visible evidence of the extension of the carcinoma and permits biopsy of the regional lymph nodes if indicated. A Churney type suprapubic incision is carried through the fascia of the rectus, severing the attachments of the rectus muscles to the pubis, and the peritoneum is freed from the bladder dome. The prostate is next palpated retropubically and an estimate of its weight in grams of tissue is made. The degree of fixation is estimated. The hypogastric and iliac lymph nodes are next examined and biopsy specimens are taken if indicated. The bladder is then opened to expose the vesicle orifice and a suprapubic catheter placed through a stab wound in the skin. This completes all necessary steps prior to actual injection so that the wound can be closed with the least possible delay.

The injection is then made with 1 ml. increments at the points of a clock around the vesicle orifice (fig. 1). Particular care is used in injecting the posterior lobe because of its proximity to the rectum. A definite sense of resistance to injection indicates that the needle is in the prostate because considerable pressure is needed to force the solution into the fibrous compartments of the gland. One milliliter is injected into each of the seminal vesicles through a point just lateral to the ureteral orifices. A second operating team then completes the closure of the wound so as to minimize the amount of exposure to radiation for any one operator.

A tumor not completely destroyed can be reinjected through the perineal approach. The occasional patient with a small nodule whose physical condition precludes any extensive operation can also be treated with this approach, as has been done in two patients. A Silverman biopsy needle is introduced through the perineum and directed into the nodule. A finger in the rectum guides the needle accurately into place. After a biopsy specimen is obtained, the needle sheath is left in place to serve as a guide for the needle of the syringe with radioactive gold. Two to 3 ml. of solution containing the predetermined amount of gold are then injected directly into the nodule. The sheath can be relocated should injection of the remaining lobes of the prostate be indicated. Usually 50 mc. of Au^{198} in a volume of 5 ml. is injected perineally.

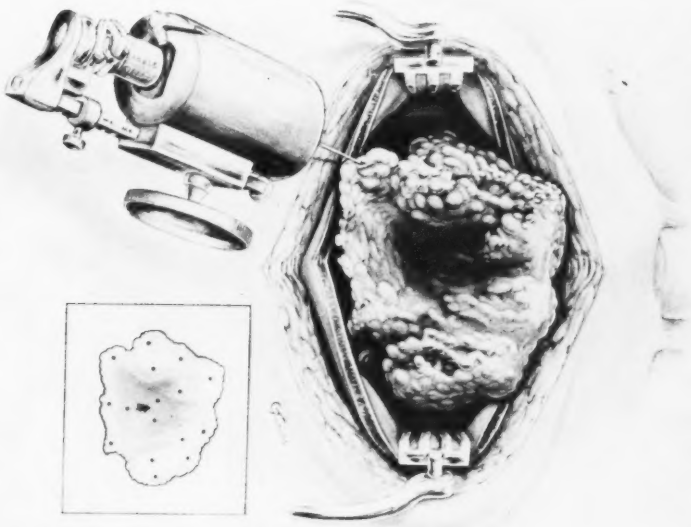

Figure 1. Drawing of large prostatic adenocarcinoma which produced frequent bladder neck obstruction. Growth was markedly delayed following injection with Au^{198}. Insert demonstrates points of injection about the bladder neck.

A certain technical skill in injection is desirable. Familiarity with the anatomy of the prostate is essential as well as the recognition of the resistance to injection that indicates proper location of the needle within the gland. In addition, estimation of the size of the gland both by rectal palpation and retropubic palpation at time of operation is made more accurate by experi-

ence. Except for these factors, no special skill is required that a trained urologist does not already have.

About 10 days of hospitalization are required for the treatment, and this mainly for the purpose of wound healing. Only 3 days of hospitalization are required for injection by the perineal route. After this period the amount of external irradiation given off from the patient does not constitute a hazard.

All patients in the present series except one have had orchiectomy. In some the orchiectomy had been done several years before Au^{198} was available. At present orchiectomy is performed in all patients as soon as the diagnosis is established. If there is no evidence of distant metastasis or uncontrolled tumor, estrogen therapy is withheld.

In order to protect the operator from the radioactivity a special syringe is required (fig. 2). The syringe was initially devised

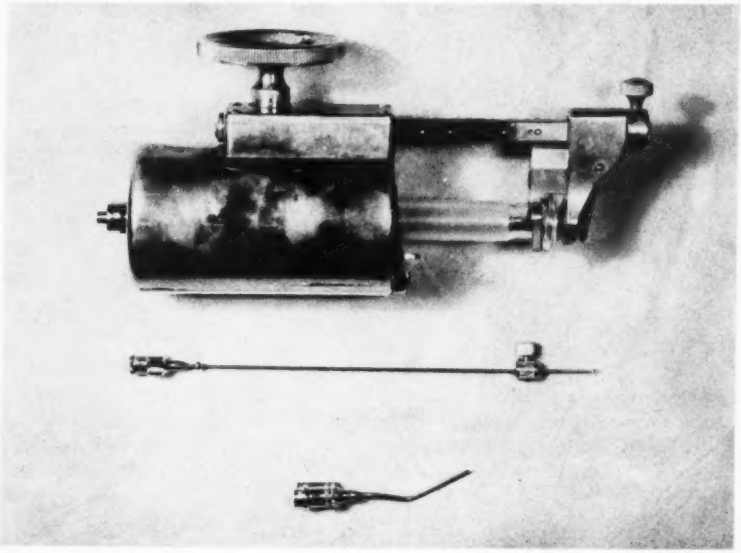

Figure 2. Special syringe for the injection of Au^{198}. The large metal barrel contains a 1.5-cm. lead wall for the protection of the operator. The needle contains an adjustable "stop" for depth control of the injection. The angled needle at the bottom is for ease of injection into the anterior lobe, usually difficult because of the bulkiness of the syringe and relatively small size of the wound.

by Flocks and associates[2] and contains a lead wall 1.5 cm. thick. This syringe* was revised by members of this hospital

*Such a syringe is now available through American Cystoscope Makers, Inc.

staff to provide further protection by filling the barrel of the plunger with lead. Direct aspiration by means of a rachet on the barrel now permits withdrawal of the plunger.

Hospital personnel, including physicians, nurses, and technicians, have not been exposed to hazardous levels of radiation in carrying out these procedures. The thickness of the lead wall of the shielded syringe is 1.5 cm. The half-value layer for the 0.411 Mev gamma ray of Au^{198} is 0.61 cm. Thus the syringe provides about 2.5 half-value layers. The filled syringe containing 50 mc. has a dose rate of less than 3.9 mr./min. at its surface to the hands of the operator or technician. Because the maximum permissible dose to the hands is 1,500 mr. per week or 250 mr. per day,[4] the operator can handle the syringe safely for 64 minutes before receiving his daily tolerance dose if he is injecting 1 or more patients 6 days per week continually. Because the actual time spent handling the syringe is never more than 10 minutes, there is no hazard to operator or technician. All exposed personnel are monitored with film badges and pocket dosimeters. None have shown significant exposure in 24 such procedures.

There is no hazard to ward personnel providing the patient is kept in isolation for 3 days following the injection, and no detectable radiation exposure has been found to private nurses in continuous attendance on patients who had injections of 150 mc. of Au^{198} in the peritoneal space.

RESULTS

In this series, biopsies were negative in 7 of our 12 patients following completion of therapy. In each patient, a biopsy of the gland was done about 3 months after each injection by needle or transurethral resection (table 2) (fig. 3). Eleven patients showed a marked decrease in the size of the lesion. In four patients who had urinary obstruction initially, the obstruction cleared. The patient who died had a proved lesion present for 3 years prior to injection. Following therapy the prostate gland was markedly reduced in size. Findings of subsequent biopsies, however, were persistently positive, and a large mass developed in his right seminal vesicle. It is believed that this procedure increased the months of comfortable survival to a greater degree than would have been possible with orchiectomy and estrogen therapy alone.

COMPLICATIONS

Complications have been minimal. No bowel ulcerations have occurred. Transient bladder spasm and tenesmus persisted for 1 to 3 days in patients with larger glands who received larger doses of Au^{198}. One patient experienced intermittent bladder irritation for 4 weeks after injection. In all patients examined

TABLE 2. *Clinical summary of patients treated with* Au^{198} *for carcinoma of prostate*

Case number	Age at time of diagnosis	Year of diagnosis	Date of last follow-up (1955)	Status	Remarks
1	58	1954	2 May	Biopsy negative	Subtotal resection for gastric ulcer in 1954. Radical prostatectomy not feasible. No orchiectomy.
2	60	1950	8 Feb.	Biopsy negative	
3	73	1949	11 Apr.	Biopsy negative	
4	50	1954	20 May	Transurethral resection negative	Operation not done because of severe cardiac disease.
5	58	1948	31 May	Transurethral resection positive	Reinjections done because of positive biopsy. Prostatic abscess now present.
6	60	1953	18 May	Biopsy positive	
7	54	1952	16 May	Died with generalized metastases	No tumor in prostate but persistent in right seminal vesicle. Ureteral obstruction and uremia.
8	67	1954	8 Mar.	Biopsy negative	Clinically operable but resection not done because of severe cardiac disease.
9	71	1954	22 Apr.	Small nodule palpable	Pulmonary and renal tuberculosis present.
10	63	1951	22 Apr.	Last biopsy negative	Severe diabetes.
11	71	1950	10 May	Prostate normal to palpation	Biopsy refused.
12	65	1955	25 May	Biopsy negative	

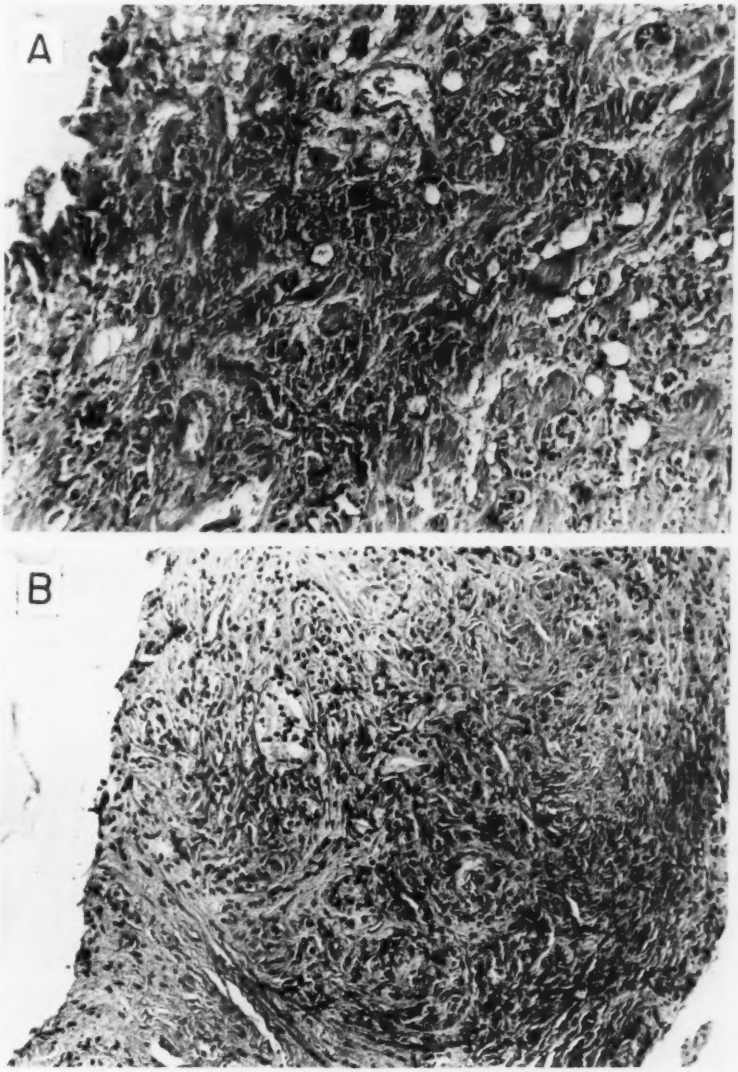

Figure 3 (case 4 in tables 1 and 2). (A) *Specimen obtained at transurethral electrosection showing adenocarcinoma of prostate.* (B) *Specimen from prostate three months after injection with* Au^{198}, *demonstrating what is considered to be a significant reaction to the radioactivity.*

proctoscopically after injection and after 3 to 6 months, the lower bowel was normal. In one patient with a 75-gram prostatic tumor, persistent spontaneous passage of small phosphatic crystals continued for 4 months. These have caused the patient no difficulty to date.

DISCUSSION

Although our series is too small to permit definite statements as to the eventual outcome of this treatment of prostatic carcinoma, sufficient data has been accumulated to corroborate the statement made of the results in a larger series[2] that Au^{198} has a definite place in the treatment of this neoplasm. Certain questions concerning side effects of the radiation have been raised and some of these can now be answered.

Considerable question has arisen as to the amount and distribution of the radioactive material transported elsewhere in the body via the blood stream and lymphatics. Cooper and associates[5] demonstrated that a relatively large amount of Au^{198} is transported to the regional lymphatics and lymph nodes. Much work has been done by others[6,7] which demonstrates that the reticuloendothelial system is the tissue primarily involved in this phenomenon. Scanograms show that the liver picks up a considerable amount of the radioactive material. Figure 4 shows a typical scanogram perfectly outlining the liver on the first

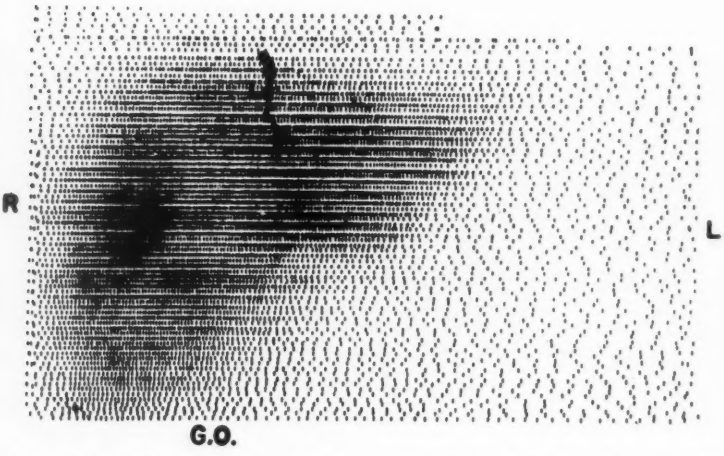

Figure 4 (case 7 in tables 1 and 2). Scanogram of liver following the suprapubic injection of 114 mc. of Au^{198}. Note the irregular distribution of the Au^{198} in the liver.

postoperative day. The spleen is also involved but to a lesser extent. In a subsequent article the amount and effect of this

activity will be discussed.[8] At this time sufficient data has been accumulated to state that although the amount disseminated is greater than originally thought, its effect is probably minor.

Carefully controlled studies of the bone marrow, liver, and blood have failed to indicate any disturbance of function in these organs. Our patients without exception have shown an over-all improvement in general health.

In addition to its use in the attempt to cure this disease, Au^{198} is occasionally indicated for palliation. It has been demonstrated that some early carcinomas in patients of the second group can be converted to operable lesions by orchiectomy and estrogen therapy with decrease in size of the mass.[9] Flocks and associates[10] believe that the number of these "conversions" may be increased through the use of radioactive colloidal gold, which causes greater shrinkage of tumor mass than orchiectomy and estrogens alone. It is also thought that dissemination of radioactivity into the local lymphatics is further assurance of conversion to an operable lesion.

Certain patients with operable prostatic carcinomas may have physical disabilities which preclude the formidable procedure of radical prostatectomy. In such patients the use of Au^{198} can offer greater possibility of control of the carcinoma than can the other palliative procedures alone.

In very large tumor masses an optimal dosage is reached which must not be exceeded. In general, a dose larger than 150 mc. of Au^{198} allows too much irradiation to surrounding normal tissue without providing adequate irradiation to the tumor. Such masses are best reinjected or injected following removal of part of the tumor by transurethral resection. Because these large glands usually are producing obstructive signs, a further indication for transurethral resection often exists. If done prior to Au^{198} injection, resection is then followed by a 3-week healing period to permit re-epithelization of the urethra so as to prevent leakage of Au^{198} into the urethra.

The normal prostate gland weighs from 18 to 20 grams.[11] In 7 patients in whom the estimated weights of the tumors ranged between 20 and 45 grams, only 1 injection was required for adequate control as shown by repeated biopsies. In 2 patients with estimated tumor weights of 40 and 75 grams, 2 injections have been required. Two patients with estimated tumor weights of 40 and 50 grams have required 3 injections; and in 1 patient with a tumor of 40 grams estimated weight, 4 injections have been required (table 1).

The complications of rectal ulcer reported in earlier series were thought due to use of an excessive volume of injectate.[2,10]

Therefore, the total amount of fluid injected does not exceed 12 to 15 ml. A larger volume results in excessive dissemination outside the prostate proper.

Dosage of the prostate gland has been calculated by the equations of Glasser and associates.[12] Assuming that none of the colloidal material leaves the tumor area, doses of from approximately 100,000 to 400,000 equivalent beta roentgens and from 10,000 to 31,000 gamma roentgens have been calculated. In six of these patients, studies have been carried out to determine how much of the colloid leaves the tumor area. A preliminary estimate suggests values of 10 to 20 per cent. This work will subsequently be reported in detail.

Eight patients have had biopsies of the liver and bone marrow done before, and at various intervals after, injection. To date no deleterious effects due to Au^{198} have been detected. This data will also be reported subsequently.[4]

CONCLUSIONS

In the treatment of a series of 12 patients with carcinoma of the prostate in whom radical prostatectomy could not be done, radioactive colloidal gold was considered to be a useful tool. Its further evaluation requires several more years of study. Its use for palliation and attempted cure of patients with group 2 type of carcinoma of the prostate is recommended.

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INSTABILITY OF AURICULOVENTRICULAR CONDUCTION IN ACUTE RHEUMATIC FEVER

I. Frequency and Extent

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THE DEMONSTRATION of carditis is one of the most valuable guides in the diagnosis and management of persons with acute rheumatic fever. Electrocardiographic evidence of abnormalities aids in establishing the presence of carditis. While no single abnormality is diagnostic of acute rheumatic fever, prolongation of the auriculoventricular conduction time is one of the most significant changes encountered during the disease, and is recognized by the presence of a first degree heart block.

While other electrocardiographic changes occur, such as alteration of the S-T segment and T wave, or changes of rhythm, or of the contour of P wave and QRS complex, the detection of a prolonged P-R interval is the most useful. The frequency with which it is discovered varies greatly and is increased by often repeated electrocardiographic examinations.[1] During the course of the disease attention is often centered upon the presence or absence of a P-R interval which is excessive for age and heart rate. Jervell[2] has emphasized that an increase of P-Q interval within normal limits also indicates damage to the A-V bundle. Lewis and Gilder,[3] Cohn and Swift,[4] and others[5, 6] found occasional adults in whom the P-R interval varied excessively without apparent cause. In most adults, however, the auriculoventricular conduction time varies less than 0.02 second.[7] While first degree heart block is always sought for during rheumatic fever as an indication of myocardial involvement, fluctuations of A-V conduction time have not been well studied.

Therefore, an investigation of the stability of auriculoventricular conduction time, during the course of acute rheumatic fever of young adults, was conducted to discern if the P-R interval

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of such patients fluctuated beyond the normal limits; if such fluctuation was related to other signs of rheumatic fever activity; and if this phenomenon was specific for rheumatic fever.

MATERIAL AND METHODS

Acute Rheumatic Fever Group. Forty-eight young adult men, hospitalized in this hospital with acute rheumatic fever, were studied. The diagnosis was made according to the criteria of Jones.[4] No selection of patients was made on other grounds, so that the group was representative of acute rheumatic fever at this age. Details of manifestations of the rheumatic fever and therapy are presented in table 1. All patients were in the acute phase of the disease at the beginning of the study. They were placed at bed rest, and received penicillin and either sodium salicylate or phenylbutazone for symptomatic relief.

A daily check of major and minor manifestation was made. Temperature and heart rate were recorded three times daily. Sedimentation rate (Wintrobe method) was repeated at 5- to 7-day intervals. Electrocardiograms (bipolar and unipolar limb leads and six standard unipolar precordial leads) were taken initially, and repeated at 12- to 72-hour intervals throughout the entire course of hospitalization. In some patients (those without ST-T changes in the 12-lead electrocardiogram) lead II only was taken serially at frequent intervals with full electrocardiograms at intervals of several days. Two Sanborn Viso Cardiette machines were used, and the constancy of their paper drive mechanism was checked at biweekly intervals.

For the purpose of this study, the P-R intervals were all measured by the same person, using conventional criteria and without knowledge of the previous measurements. The P-R interval was considered to be unstable as long as it fluctuated by more than 0.02 sec from the previous observations. The variation in the P-R interval was the difference between the maximum and minimum P-R interval observed during the illness. The duration of unstable P-R, elevated sedimentation rate, temperature, tachycardia, and symptoms was expressed as days after admission to the hospital. On an average, this admission day was about the sixth day of the illness.

Control Groups. Two control groups of young men of similar age were followed in an identical fashion.

1. *Persons with acute febrile disease.* Thirty-one young men with acute tonsillitis, bronchitis, or pneumonia, but without any manifestations of rheumatic fever, comprised this group. Electrocardiograms were taken every 24 to 48 hours during the entire course of the disease and convalescence, and the P-R interval was measured.

TABLE 1. *Clinical aspects of case material*

Number of patients (all men)	48
Average age at onset of current attack	19.5 years
Days of illness at time of hospitalization	6.0 days
Chemotherapy	
Penicillin	100 %
Sodium salicylates	66 %
Phenylbutazone	33 %
Major manifestations of patients with:	Percent
Carditis	33
Development of or change in murmur	20
Change in heart size	3
Pericarditis	9
Congestive failure	3
Polyarthritis	95
Chorea	0
Subcutaneous nodules	0
Erythema marginatum	4
Minor manifestations of patients with:	
Fever	93
Elevated sedimentation rate	93
Abnormal P-R interval or other ECG changes	35
Rheumatic fever history:	
Personal past history of rheumatic fever	33
Personal past history of heart murmur	7
Family history of rheumatic fever	14

2. *Normal controls.* Electrocardiograms were taken on 20 normal young men at 24- to 48-hour intervals.

RESULTS

A summary of results is presented in table 2. In the group with acute rheumatic fever, the variation in A-V conduction time was 0.056 second. This includes 21 patients who developed first degree heart block and in whom the P-R interval returned to nor-

TABLE 2. *Variations in the P-R interval in acute rheumatic fever, acute febrile diseases, and normal controls and the relations of this to clinical and laboratory findings*

	Acute rheumatic fever 48 patients; 938 ECGs	Acute febrile diseases 31 patients; 277 ECGs	Normal controls 20 men; 140 ECGs
Patients with first degree heart block	21 (44%)	2 (6%)	0
Patients with unstable P-R interval	41 (85%)	12 (39%)	0
Variation in P-R interval			
Mean	0.056 sec	0.024 sec	
Standard deviation	0.030 sec	0.012 sec	
Significance of difference of means (T value)*	6.5		
Average duration in days of:			
Unstable P-R interval			
Mean	73	21	–
Standard deviation	43	22	–
Significance of difference of means (T value)*	5.8		
Elevated sedimentation rate	37	–	–
Elevated temperature	29	4	–
Tachycardia (>90)	29	–	–
Symptoms	21	–	–
Therapy	66	–	–

$$*T = \frac{\overline{M}_1 - \overline{M}_2}{\sqrt{\left(\frac{SD_1}{\sqrt{n_1}}\right)^2 + \left(\frac{SD_2}{\sqrt{n_2}}\right)^2}}$$; T above 3.0 significant.

mal limits (first degree heart block persisted in one patient). An analysis of the A-V conduction time of the 21 patients with first degree heart block was made as follows: The variation in their A-V conduction time was measured separately during the period subsequent to the disappearance of the first degree block. During this period, when all P-R intervals were normal, the mean variation in P-R interval was 0.04 second. In other words, in this group of 21 patients with prior first degree block, the A-V conduction time continued to fluctuate excessively even after its return to conventional normal limits of duration (0.20-0.12 sec).

For the entire group of 48 patients, instability of the A-V conduction time persisted on the average for 73.1 days. An unstable

P-R interval was not observed in six patients with rheumatic fever, while in one patient the electrocardiograms were discontinued before reaching a stable P-R interval. In individual patients and in the group as a whole, the duration of instability of A-V conduction time did not parallel the duration of an elevated sedimentation rate, fever, tachycardia, or symptoms.

The frequency with which individual rheumatic fever patients displayed various fluctuations in their P-R interval is as follows: No patient had electrocardiograms in which the P-R interval did not vary at all or by only 0.01 second. The maximum P-R variation was 0.02 in 6 patients; 0.03 in 6; 0.04 in 11; 0.05 in 3; 0.06 in 7; 0.07 in 4; and 0.08 sec in the remaining 7 patients.

In the group of patients with acute febrile disease, only two showed prolonged A-V conduction time. Both were men with acute tonsillitis, who were followed for 90 days after recovery and showed no manifestation of rheumatic fever. The mean variation in P-R interval was 0.024 second. In 12 patients (39 per cent) the A-V conduction time fluctuated by more than 0.02 second. This lasted 21 days.

Analysis of 140 electrocardiograms taken on 20 healthy young men revealed that the P-R interval had a mean variation of 0.021 second. An occasional P-R interval was measured as 0.03 sec different from its predecessors, but the vast majority of the P-R measurements were within 0.01 sec of each other in each individual.

DISCUSSION

The results of this study indicate that the P-R interval fluctuates excessively in most patients (85 per cent) with acute rheumatic fever. In these young men this fluctuation occurs within the normal conventional limits of the P-R interval, and is observed in persons who do or do not develop a partial or first degree heart block. The instability of A-V conduction time is most frequently detected by taking electrocardiograms at not more than 24-hour intervals, and, for all practical purposes, a strip of lead II serves as an adequate test. Such a procedure is inexpensive in time and money in comparison with a complete electrocardiogram or with other laboratory tests, but has the disadvantage of not being adequate for the detection of ST-T changes.

The high frequency of an unstable P-R interval in acute rheumatic fever is in keeping with the previously published series of Cohn and Swift[4] and that of Master and Jaffe.[2] In both, electrocardiograms were taken at very frequent intervals, and some abnormality, including prolonged A-V conduction time, as well as changes in rhythm, ST-T and QRS, was detected in 93 per cent and 100 per cent of the patients, respectively. Fluctuation of A-V

conduction time has been noted as a specific isolated electrocardiographic change during rheumatic fever by several investigators. Jervell considered that an increase in P-Q interval within normal limits was of importance during the course of acute rheumatic fever. Reyersbach and Kuttner[10] studied a large group of normal children and a group convalescing from rheumatic fever (not over 15 years of age) and observed an equal incidence of spontaneous variations in the P-R interval when first degree heart block was present. They considered that changes in the P-R interval in children with rheumatic fever were of doubtful clinical significance. The greater spontaneous instability of A-V conduction time in children in contrast to adults has been noted frequently. The implication is that the observations of the present study are probably applicable only to adults, in whom the P-R interval is usually remarkably constant, although normal adults may rarely show spontaneous variations.[3-6] Rosenbaum[11] stated that a patient is in the active stage of rheumatic fever as long as the A-V conduction time changes from one observation to the next.

Cohn and Swift,[4] in their systematic study of 37 patients with rheumatic fever, found changes of duration of A-V conduction time to be an almost constant occurrence, but gave no figures of the incidence. As in the present study, they made day-by-day observations using lead II for measurements, and considered significant changes in A-V time at/or above 0.02 second. Their first three illustrations are examples of this phenomenon, and are identical to the findings in this study. The P-R interval fluctuated up and down, often completely within normal limits (as in their figure 3) during the acute phase of the disease, eventually becoming stable (no more than 0.02 sec change serially). They also noted that changes in A-V conduction time, although frequent, did not parallel the temperature of the patient.

In the present series, instability of A-V conduction time lasted about twice as long as did an elevated sedimentation rate, fever, tachycardia, or symptoms. This corresponds to the observation of Ehlersten[12] and Jervell.

Increase in length of A-V conduction time to first degree block and instability of the P-R interval within normal limits is not a phenomenon specifically associated with the acute phase of rheumatic fever in adults. First degree heart block has been noted in a variety of infectious diseases, but not with the same frequency with which it is found in rheumatic fever.[4] In the present series, first degree heart block was found in 2 of 32 patients, both with acute tonsillitis. Jervell, Otto,[13] Hotz,[14] and Levander-Lindgren[15] reported as high as a 60 per cent incidence of disturbed A-V conduction in such patients, usually after the acute stage is passed.

Definite instability of A-V conduction time (*i. e.*, P-R interval varying by more than 0.02 sec in successive tracings) was found in 12 (39 per cent) of 31 patients with febrile illness. The frequency, degree of variation (mean, 0.024 sec), and its duration (21.2 days) were distinctly less than that observed during acute rheumatic fever.

The instability of A-V conduction time, in rheumatic fever and febrile disease, may be the result of a variety of processes.[16, 17] No attempt was made to elicit the pathogenesis, but rather to indicate its frequency. Whether unstable A-V conduction time indicates carditis is not known, for in this series, as in the large series of Sokolow,[18] unequivocal evidence of carditis appeared in only 33 per cent of patients, while instability of the P-R interval was present in 85 per cent.

SUMMARY

Forty-eight young men with acute rheumatic fever were studied electrocardiographically at 12- to 72-hour intervals throughout their hospitalization. The A-V conduction time was found to be very unstable, even within normal limits, in 85 per cent of the patients during the acute and convalescent stages of the disease.

Thirty-one persons with acute respiratory diseases were studied in a similar fashion. Instability of the A-V conduction time was observed in this group, but with a lower frequency and to a lesser degree.

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THE STETHOSCOPE AND MITRAL STENOSIS

In listening for the low-frequency mid-diastolic rumble of mitral stenosis, the bell of the stethoscope is generally more useful than the diaphragm, which tends to screen out the lower-frequency sounds so that it may enable those of higher frequency to be heard more easily.

When the bell is used, one should apply it first of all firmly to the chest wall and, while listening intently, gradually relax the pressure of the bell against the skin. A murmur at first inaudible with firm pressure may become clearly audible with light pressure. The reason for this is that firm pressure of the bell against the chest causes the skin to be stretched tightly across the mouth of the bell so that a high-frequency diaphragm is created. Relaxing this pressure converts the bell to a low-frequency recorder, and so the murmur may be heard.

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HOWARD B. SPRAGUE, M. D., and
MAURICE B. RAPPAPORT, E. E.
in *New England Journal of Medicine*
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INSTABILITY OF AURICULOVENTRICULAR CONDUCTION IN ACUTE RHEUMATIC FEVER

II. Effect of Position on First Degree Heart Block

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PROLONGATION of auriculoventricular conduction time appears in about one third of all patients with acute rheumatic fever. Its detection is one of the most valuable diagnostic signs and is generally interpreted as indicating the presence of active carditis. The role of the autonomic nervous system in the production of first degree heart block has been investigated by Jervell,[1,2] Robinson,[3] Bruenn,[4] and others.[5,6] Atropine, or to a lesser degree, mecholyl, definitely shortened the P-R interval, often to a normal value, in the majority of persons with a prolonged P-R interval associated with acute rheumatic fever. Because vagus-blocking drugs also shorten the P-R interval of well persons with an incidental first degree heart block,[1,6] the value of atropine in differentiating between partial heart block due to "vagotonia" and to disease is uncertain. The instability of the P-R interval when it is prolonged, whether associated with cardiac disease of diverse causes or not, has been emphasized further by the observation that assumption of an erect position will also greatly shorten a prolonged P-R interval.[5,7]

The only examination of effect of posture on first degree heart block associated with acute rheumatic fever is included in the 31 cases published by Scherf and Dix.[7] Four of their patients had acute rheumatic fever, and in all the prolonged P-R interval was shortened to normal limits when the patient stood erect. Any immediate changes produced by posture alone are thought to originate only in nervous reflexes originating in the aortic and carotid sinus and from the thigh.[7] The status of partial heart block in acute rheumatic fever is unique in that it is frequently the only objective sign in the diagnosis of rheumatic fever and

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carditis, while in other cardiac diseases the diagnosis of heart involvement can usually be made by other means. The apparent dependence of the P-R interval in rheumatic fever upon the status of the autonomic nervous system, as revealed by experiments with vagus blocking drugs, suggests that its value as a diagnostic sign of rheumatic carditis is doubtful. Accordingly, an investigation of the effect of posture alone on first degree block associated with acute rheumatic fever seemed indicated.

MATERIAL AND METHODS

Thirty young men with acute rheumatic fever and associated prolonged P-R interval were studied. The diagnosis was based on the criteria of Jones,[8] and all patients were receiving only penicillin and either salicylates or phenylbutazone at the time the observations were made. The P-R interval was measured by the conventional method from electrocardiograms consisting of leads I, II, and III taken by Sanborn direct writing machines. Only persons who developed, while ill, a P-R interval of 0.21 sec or more while in the supine position were studied. The three-lead electrocardiogram was repeated about two minutes after each person had assumed first the sitting and then the standing position. The patients then assumed a supine position again and inhaled sufficient amyl nitrite fumes from two crushed pearls to produce tachycardia, at which point the electrocardiogram was again taken. The entire test was done in duplicate on five of the patients. The P-R interval and rate were measured from the same lead with the best defined P waves in each position. If accurate measurement of the intervals was not possible due to electrocardiographic artifacts such as somatic tremor, the graph was eliminated from the series. All graphs taken in the erect position were satisfactory, but some were eliminated from each of the other groups. The same procedure was repeated with 15 normal young men of similar age who had normal electrocardiograms at rest.

RESULTS

The results of the study are presented in table 1. In patients with rheumatic fever the P-R interval shortened from a mean of 0.22 sec at a mean rate of 73.5 to normal limits in 13 of 22 trials, with the change to a sitting position. The mean P-R interval shortened to 0.200 sec while the mean rate increased to 87 beats per minute. The mean P-R observed in the erect position and after the administration of amyl nitrite was shortened to 0.18 sec and the P-R intervals became normal in 31 of 35 trials and 26 of 31 trials, respectively. In no individual patient did the production of a more rapid tachycardia with amyl nitrite shorten further a P-R interval which failed to become normal in the erect position.

TABLE 1. *Effect of position and amyl nitrite administration on heart rate and P-R interval of normal persons and patients with rheumatic fever*

	Number of tests	Number of times P-R interval shortened to normal	Mean heart rate/min of entire group	Mean P-R interval/sec of entire group
30 patients with rheumatic fever				
Supine	34	–	73.5	0.221
Sitting	22	13	87.3	0.200
Erect	35	31	93.9	0.180
After amyl nitrite	31	26	103.3	0.185
15 normal persons				
Supine	15	–	64.40	0.184
Sitting	15	–	74.93	0.174
Erect	15	–	79.53	0.165
After amyl nitrite	15	–	100.73	0.161

In the 15 normal young men the progressive changes from supine to sitting and to erect position followed by amyl nitrite administration produced similar progressive increase in heart rate. The P-R interval also shortened moderately, 0.01 sec sitting and 0.02 sec when erect or following amyl nitrite.

DISCUSSION

Shortening of a prolonged P-R interval to normal limits as a result of sitting or erect posture or tachycardia, which we found in a high percentage of patients with acute rheumatic fever, is similar to the results obtained by Scherf and Dix[7] in four of their patients with rheumatic fever. In patients with heart disease of hypertensive or arteriosclerotic origin, they found that the P-R interval shortened to normal limits during this procedure in only 48 per cent. The P-R interval of the normal control series remained within the ± 0.01 sec variation.

In this study a substantially greater increase in rate followed amyl nitrite than the assumption of an erect position, but the shortening of the A-V conduction time was almost identical. Thus nervous factors other than those responsible for rate alone are involved in the effect of erect posture on the P-R interval. This close relationship between changes of autonomic status and the prolonged P-R interval of rheumatic fever origin is somewhat in contrast to the prolonged P-R interval found in other types of heart disease. The relationship is further emphasized by the similar effect of atropine in patients with rheumatic fever as well as in "vagotonic" persons. This led Robinson to note that

atropine cannot be used to differentiate between first degree heart block caused by vagotonia or rheumatic fever. Bruenn made similar observations and concluded that in acute rheumatic fever, impairment of the A-V conduction is due to increased vagal tone. The present study, illustrating the role of posture alone in the production of first degree heart block in rheumatic fever, appears to be evidence in favor of vagal origin of the conduction disturbance, evidence that such first degree heart block may not indicate carditis.

Caution in taking the electrocardiogram during acute rheumatic fever is also indicated. Almost one half of first degree heart blocks will be missed if a tachycardia is developed, or if the patient is seated, while taking the electrocardiogram.

SUMMARY

Fifteen normal young men and 30 young men with acute rheumatic fever and an associated prolonged P-R interval in the supine position were studied electrocardiographically. The P-R interval was measured while the subjects were in the supine, sitting, and erect positions, and again while supine after inhaling amyl nitrite fumes. Sitting and erect positions produced progressive shortening of the P-R interval toward normal limits, and the erect position caused more patients to assume a normal interval than did a tachycardia caused by amyl nitrite. These results are considered additional evidence that first degree heart block associated with rheumatic fever may be of nervous origin and not necessarily indicate carditis.

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EXPERIENCES WITH DUAL READING OF CHEST PHOTOROENTGENOGRAMS

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TUBERCULOSIS has always been a medical problem of military importance. It was the principal reason for discharge for disability in the United States Army during World War I, accounting for 15 per cent of all such discharges.[1] It has been costly, not only in its requirements for hospital care in the armed services, but also in the postservice expense assumed by the government in continuing medical treatment and financial compensation.

In the United States military forces in World War II a great advance was made in all services by efforts to exclude recruits and Selective Service registrants with tuberculosis. Regulations carefully followed by the Medical Departments of the Army and Navy resulted in the detection and rejection for tuberculosis at recruiting and induction stations of about 1.25 per cent of all men examined.[2] As a result of these procedures and other measures to prevent the development of tuberculosis during military service, the prevalence of the disease in military personnel and the hospital admission rates for tuberculosis, as compared with World War I rates, declined greatly. In the Army the hospital admission rate for tuberculosis averaged less than 1 per 1,000 men per year for the war as a whole, and for the last 2 years of the war, prior to the demobilization discharges, averaged not more than 1 per 2,000 men per year.[3] In the Navy the incidence rate, which was slightly over 1 per 1,000 in 1943, receded to 0.8 per 1,000 in 1944, the lowest rate recorded up to that time. The incidence rate increased again with demobilization discharges in 1945 and 1946, after which it declined steadily.[4]

Nevertheless, in spite of the great savings by exclusion from service of men with latent tuberculosis, a significant number of cases occurred in military personnel during the war. This was partly the result of fresh infection from contact with open cases during service, but a substantial portion represented failure to

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This study was carried out through a contract with the Research and Development Division of the Office of the Surgeon General, Department of the Army.

detect cases in spite of apparently adequate examination at the point of entry. One estimate, made after careful study early in the war, indicated that from 5 to 44 cases per 10,000 men examined were missed through faulty reading of roentgenograms at induction stations in different parts of the country.[5]

During World War I the principal method for detecting pulmonary tuberculosis was physical examination. A small number of roentgenograms were made, but by modern standards they were of inferior quality, with poor contrast in markings and of correspondingly low diagnostic value. During World War II, rapid mass x-ray survey methods were employed, using photoroentgen and paper films. By the end of the war all induction stations used four- by five-inch photoroentgenograms, and with exceedingly rare exceptions all entering personnel were roentgenographed before acceptance.

After the war, however, an unexpected development cast some doubt on the reliability of even the best roentgenographic interpretations. With large numbers of films of different size and variable quality to file for future reference, the administrator of Veterans Affairs invited a small board of roentgenologic experts to make a joint study of the diagnostic value of representative films of different sizes. The results of the study by this group disclosed the fact that the roentgenologists varied considerably among themselves in their interpretation of the same films, and further investigation revealed the surprising fact that each of the highly experienced and unquestionably competent physicians in the study, when rereading a film after an interval of a few days or weeks, frequently contradicted his own earlier interpretation.[6] Discrepancies in reading occurred not only with respect to the extent and character of tuberculosis, but also with respect to the actual presence or absence of tuberculous lesions.

Subsequently this experience was abundantly confirmed, both in the United States[7-9] and abroad.[10] Pitfalls in photofluorographic diagnosis in the screening of military personnel and the value of dual reading were emphasized by Bircher and Castle[11] in the Navy, with a detailed analysis of the re-examination of photofluorographic films during a four-month period in 1953.

A later, intensive study of the entry and separation films of 3,000 men discharged for tuberculosis and 3,000 discharged for other reasons in World War II has confirmed these findings in every respect.[12] That study, while revealing the fallibility of roentgenographic screening at induction stations, also led to recommendation of procedures for minimizing errors and discrepancies in interpretation of films that may be of value in future induction examinations.

OBJECTIVES OF STUDY

The investigation reported herein was carried out (1) to determine the incidence and the types of tuberculosis encountered in prospective recruits at Armed Forces examining stations, (2) to study discrepancies in interpretation of films by different roentgenologists and to explore the advantages of dual reading of x-ray films, and (3) to recommend procedures for the future that would promise greater reliability of interpretation than has existed in the past without losing the efficiency and speed required in induction examinations.

PLAN OF STUDY

With these objectives in mind an investigation was set up. Under contract with the Medical Research and Development Board of the Office of the Surgeon General, Department of the Army, and with the cordial co-operation of the offices of The Surgeon General of the Army and The Surgeon of the Second Army, a system of operation was established in which three Armed Forces examining stations in the Second Army Area participated. These examining stations are herein designated as stations A, B, and C. Under the plan originally developed, one day's films were subjected to dual reading each week, first by the station of origin, and a day or two later by one of the other stations. During later months of the study, induction calls were so low that, in order to secure a statistically significant number of films, each day's films were so examined. All films were four- by five-inch photoroentgenograms routinely taken at the participating stations.

The number of films studied (20,973) and the length of time during which the investigation was carried out (20 months) appeared sufficient to prevent the bias and selection that might have occurred with a smaller number of films or a shorter period of observation. The inductees whose films were studied were all about the same age, *viz.*, 19 to 22 years. No significant differences in the type of recruit called for examination were noted at the three stations.

A final check was made by referring all films not diagnosed as negative to a referee roentgenologist (SCS) in the office of the responsible investigator (ERL). This roentgenologist also read by random selection about 5,000 films that had been interpreted as negative by the roentgenologists of two examining stations.

The procedure for interpretation and exchange of films was as follows: Preliminary study had disclosed that on an average day station A had about twice as many inductees as station B or station C. In spite of a considerable difference in the population of the latter two cities, the areas served were such that the numbers of

inductees at the two stations were about equal. Each station read its own day's run of films on the day of their preparation and forwarded them to another station for similar independent reading the next day. To distribute the load fairly, all station B and station C films were sent to station A for their second reading, while about half of the station A films were sent to station B and half to station C. All film interpretations were sent promptly to the liaison investigator in the study (HJH), who compared the readings and set aside all films read as abnormal, together with a representative selection of those read dually as negative, for a third reading by the referee roentgenologist. After all of these procedures were completed, the records were assembled in the office of the responsible investigator and the films were returned to their stations of origin for final disposition and filing.

At the beginning of the study all of the participating roentgenologists attended a conference in the office of the responsible investigator, in which procedures for the study were outlined, and agreement was reached on the principles of diagnosis to be followed in recording results. No attempt was made to revise the bases of judgment followed by the roentgenologists individually in reaching their conclusions, because a fundamental object of the investigation was to compare in a representative way the readings of roentgenologists selected by surgeons in command of Army Areas as competent for the purpose. Each of the roentgenologists in the study was a civilian physician with long experience in private practice and hospital roentgenology in his own community.

The basic form for the study was the one employed in the intensive postwar study of induction and discharge films of 6,000 veterans, cited above.[12] This form, originally devised by Dr. W. Edward Chamberlain, is reproduced in figure 1. In the previous study it had proved to be practical, well calculated to bring out differences in diagnosis by different readers, and suitable also for combinations of diagnoses within narrow or wide ranges that could be used in determining the limits of diagnostic range, thus ensuring some uniformity of interpretation. Readers were requested to diagnose "tuberculosis" if they believed that roentgenographic indications were decisive, and to record a diagnosis of "suspected tuberculosis" if the markings in location, character, or extent suggested tuberculosis but were not well enough defined to induce the reader to make a definite diagnosis of that disease. In addition each reader was asked to categorize all diagnoses of tuberculosis or suspected tuberculosis in terms of activity and extent.

In view of the emphasis placed by Mobilization Regulations of World War II on calcified lesions as evidence of past tuberculosis, readers were asked to record pulmonary calcification. They also were requested to note pleurisy with effusion and to record as dry

pleurisy any fibrotic lesions of the pleura that exceeded simple apical thickenings and minor defects in the diaphragmatic contour. Finally they were asked to note any changes in heart size or contour that suggested organic abnormality and to distinguish other nontuberculous disease of the lungs if the indications warranted.

Case No.: Film Date: Film Type:

Name: Date Read:

A x Not read
9 Negative
8 Unsatisfactory
7 Tuberculosis
6 Suspect tuberculosis
5 Calcification _____
4 Pleurisy, dry
3 Pleurisy, wet
2 Other disease

B 1 Upper right
2 Upper left
3 Lower right
4 Lower left

C 9 Minimal
8 Moderately advanced
7 Far advanced
6 Extent not classifiable
5 Tumor
4 Sarcoidosis
3 Cardiac
2 Unclassified

D No cavitation
1 Believed inactive
2 Questionable activity
3 Believed active
4 Cavitation

Figure 1. Form used for the study. Cards of different color or with different markings were used by the originating and rereading stations.

PREVALENCE OF TUBERCULOSIS IN INDUCTEES

Table 1 records the points of origin and rereading of the films studied, and table 2 summarizes the diagnoses made at the three co-operating examining stations in the 20,973 films read. Table 3 compares the readings of the roentgenologists of the different examining stations with respect to major diagnoses.

TABLE 1. *Summary of roentgenograms read dually in examining stations A, B, and C*

Stations		Number of films
First reading	Second reading	
A	B	4,876
A	C	5,821
B	A	5,066
C	A	5,210
Total		20,973

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TABLE 2. *Interpretation made from 20,973 roentgenograms read dually in three examining stations*

Films from station	Diagnoses by station	Total films	Diagnoses (per cent of total)					
			Negative	Tuber-culosis	Suspected tuberculosis	Calci-fication	Heart disease	Other
A	A	4,876	98.13	0.59	0.04	0.44	0.47	0.31
	B	4,876	98.85	0.12	0.18	0.36	0.14	0.33
A	A	5,821	98.96	0.27	0.05	0.25	0.27	0.18
	C	5,821	99.30	0.05	0.26	0.06	0.18	0.13
B	B	5,066	96.17	0.67	0.37	2.01	0.41	0.36
	A	5,066	96.30	0.86	0.17	1.73	0.47	0.44
C	C	5,210	99.06	0.11	0.36	0.05	0.13	0.27
	A	5,210	99.11	0.09	0.32	0.05	0.13	0.26

TABLE 3. *Diagnoses of tuberculosis or suspected tuberculosis by readers in three examining stations*

Station		Originating		Rereading		Agreement	
Originating	Rereading	Total cases	Minimal inactive	Total cases	Minimal inactive	Total cases	Minimal inactive
A	B	31	19	15	15	12	4
A	C	19	13	18	12	10	5
B	A	53	46	53	22	9	5
C	A	25	17	22	12	11	5
Total		128	95	108	61	42	19

Diagnostic agreement on either tuberculosis or suspected tuberculosis is disconcertingly low. Confining ourselves to the definite diagnoses of tuberculosis (all stages and degrees of activity) on which the percentages recorded in table 2 are based, we find that among 20,973 films the originating stations diagnosed "tuberculosis" 85 times, *i. e.*, at a rate of 40.53 per 10,000 films. When the same films were read independently a second time by the roentgenologist of another station, however, only 58 were interpreted as definitely indicating tuberculosis. Surprisingly, in only 13 films was there agreement on this diagnosis. Thus, in the examination of 20,973 films, dual reading yielded 130 [*i. e.* (85+58)-13] definite diagnoses of tuberculosis. This represents a rate of 61.98 diagnoses per 10,000 films.

If we analyze the films for the diagnosis of "suspected tuberculosis" we find a similar paucity of agreement. The originating stations made this diagnosis 43 times, and the rereading stations 50 times. Therefore the total number of diagnoses on dual reading, after subtraction of three cases in agreement, is 90 [(43+50)-3], a figure yielding a rate of 42.96 per 10,000 films.

The disagreement in interpretation is striking. Its nature will be analyzed in greater detail later. For present purposes it is important to determine maximum and minimum figures for the diagnosis of tuberculosis in order to indicate the prevalence of this disease in potential inductees and its importance as a cause of rejection by the Armed Forces. For maximum safety in the exclusion of tuberculosis, under the conditions of this investigation, we might consider as subject to rejection all candidates diagnosed as "tuberculosis" or "suspected tuberculosis" by either or both of two readers, minus those in which two readers agreed on a diagnosis of inactive tuberculosis or suspected tuberculosis of minimal extent. Table 3, constructed on this basis, shows that in the interpretation of 20,973 films a total of 194 were interpreted at one or another station as showing "tuberculosis" or "suspected tuberculosis." Among the 194 separate diagnoses of tuberculosis or suspected tuberculosis were 19 films in which the rereading station had agreed on an interpretation of inactivity and minimal extent. Subtracting these there remain 175 diagnoses of tuberculosis or suspected tuberculosis, of active or questionably active character or of inactive character exceeding minimal extent. This represents a rate of 83.44 per 10,000 persons examined and may be looked on as a maximum rate of detection on the basis of dual reading.

In contrast to this we may calculate the number of diagnoses of tuberculosis or suspected tuberculosis exceeding "minimal inactive" in severity or extent that were made on the original examinations. Although the total number of agreements on inactive tuber-

culosis of minimal extent was small, the total number of original diagnoses of this category was comparatively large [*viz.*, 95 diagnoses in 128 (85+43) diagnoses of tuberculosis or suspected tuberculosis], leaving only 33 diagnoses of active or questionably active tuberculosis, suspected tuberculosis, or inactive tuberculosis moderately or far advanced in extent. This figure yields a rate of 15.73 per 10,000 men examined. Thus in a nation-wide survey, if comparable rates of diagnosis held for the country at large, the extra safety which might be conferred by the exclusion of men diagnosed by a dual reading system as carrying tuberculous lesions of serious or potentially serious character, would be at the expense of a rate of 83.44 minus 15.73, or 67.71 inductions per 10,000 men examined.

CHARACTER OF DISAGREEMENTS IN DIAGNOSIS

We may now analyze more intimately the nature of the disagreement between roentgenologists in dual reading of the photoroentgenograms studied in this investigation. Discrepancies with respect to major diagnosis are indicated in table 4. It will be noted that in these tables the reading of the referee roentgenologist in the office of the responsible investigator is included. This investigator had the advantage (or disadvantage from the point of view of possible bias) of knowing that a diagnosis of abnormality had previously been made.

A very wide range of disagreement is evident. The extent of discrepancy is so great that a detailed analysis of variations in diagnosis, even by major categories, is not warranted. Certain trends, however, seem worth noting.

The station B and station C roentgenologists, when reading station A films, generally tended to take a less serious view of them than did the station A reader; the latter, in turn, exhibited the same tendency when reading films from stations B and C. Thus, although the station A reader interpreted as showing "tuberculosis" 8 of 19 films diagnosed as "suspected tuberculosis" by the station B reader, he read 9 of the 19 as negative, while of 34 films first read in station B as showing "tuberculosis" he diagnosed 25 as "negative" and only 5 as "tuberculosis." In the case of films from station C, the station A reader diagnosed much less "tuberculosis" in the films first read as such in station C, but divided the films read as "suspected tuberculosis" chiefly into "negative" and "tuberculosis" categories. However, when table 5 is examined, it is seen that the station A reader tended not to confirm diagnoses of inactive tuberculosis by the originating stations, but to read an even higher proportion of active tuberculosis than they did.

The referee reader read somewhat less tuberculosis in the station B films read by the station B reader as abnormal than did the

TABLE 4. *Discrepancies in diagnoses made on same films by readers at originating and rereading stations and by referee reader*

Diagnosis	Readings of 4,876 station A films			Readings of 5,821 station A films			Readings of 5,066 station B films			Readings of 5,210 station C films		
	A	B	Referee	A	C	Referee	B	A	Referee	C	A	Referee
Tuberculosis	29	4	23	16	3	13	34	5	8	6	1	1
Suspected Tbc.		8	1		7	1		0	1		0	1
Calcification		2	0					2	1		2	0
Other		4	2		2	0		2	2		1	1
Negative		11	3		4	2		25	22		2	3
Suspected Tbc.	2			3			19	2	1	19	2	0
Tuberculosis		0	1		0	1		8	13		5	12
Calcification											1	0
Other								0	2			
Negative		2	1		3	2		9	3		11	7
Calcification	22	11	15	15	4	8	102	38	31	3	2	2
Tuberculosis		1	0					2	6			
Suspected Tbc.		0	1		2	0		0	6			
Other		0	2					0	1		0	1
Negative		10	4		9	7		62	58		1	0

TABLE 4. *Discrepancies in diagnoses made on same films by readers at originating and rereading stations and by referee reader*—Continued

Diagnosis	Readings of 4,876 station A films			Readings of 5,821 station A films			Readings of 5,066 station B films			Readings of 5,210 station C films		
	A	B	Referee	A	C	Referee	B	A	Referee	C	A	Referee
Heart disease	23	7	15	16	8	14	21	14	16	7	6	7
Tuberculosis								1	0			
Suspected Tbc.		1	0									
Other		1	1					0	2			
Negative		14	7		8	2		6	3		1	0
Other	15	9	13	10	6	7	18	6	13	14	10	11
Tuberculosis		1	0		0	2		0	2		0	2
Suspected Tbc.								1	1			
Heart disease											1	1
Negative		5	2		4	1		11	2		3	0

latter, but took a graver view of the films read in station B as "suspected tuberculosis." His reaction to the station C films was similar, but in the case of films from station A, he came to closer agreement with the interpretations made at that station.

DISCREPANCIES IN DETERMINING ACTIVITY OF TUBERCULOSIS

Discussion with reference to diagnosed activity of disease will be confined to films designated by one or another station as definitely "tuberculosis" (tables 5 and 6). Table 5 summarizes cases and rates for dual reading of active, questionably active, and inactive tuberculosis in the various stations. It will be noted that the discrepancy in interpretation is great. Table 6 indicates specifically how films read as "tuberculosis" of varying activity by the originating station were read with respect to activity by the rereading station. Once again we find that the station B reader tended to read less severe tuberculosis in the station A films than did the roentgenologist at the latter station, while the referee reader read the same films as representing even more severe tuberculosis than did the original reader. Virtually the same comments apply to the rereading of station A films by the station C and referee roentgenologists.

The number of original diagnoses of active and questionably active tuberculosis made by the station B and station C roentgenologists was so small that figures with respect to diagnoses of severity, on rereading by the station A and referee readers, were not highly significant. On the whole, both of the latter read a little more severity of disease into the films read by the station B and station C readers than did the latter on original reading of those films.

DISCREPANCIES IN DETERMINING EXTENT OF TUBERCULOSIS

A somewhat similar type of discrepancy is evident when interpretations of the different examining station roentgenologists and the referee reader are compared with reference to extent of tuberculous lesions (table 7). Again comparison will be restricted to lesions diagnosed definitely as "tuberculosis." It will be seen that both the station B and the station C roentgenologists tended to read the station A films as somewhat less serious in extent than did the station A roentgenologist, while the referee reader was in approximate agreement with the latter. It should be noted, however, that in a few cases the station B reader "upped" the diagnosis of the station A reader. When the station A roentgenologist in turn read the films from station B and station C he interpreted the former as less advanced and the latter as slightly more serious than the roentgenologists in the stations of origin. It is worthy of special note that the station A reader diagnosed as

TABLE 5. *Activity of tuberculosis as diagnosed by originating and rereading stations*

Stations		Total films	Active		Questionably active		Active plus questionably active		Inactive	
Originating	Rereading		Cases	Per 10,000	Cases	Per 10,000	Cases	Per 10,000	Cases	Per 10,000
A	A	4,876	5	10.25	6	12.31	11	22.56	18	36.95
	B		1	2.05	3	6.15	4	8.20	9	18.45
A	A	5,821	3	5.15	2	3.43	5	8.58	11	18.18
	C		2	3.43	2	3.43	4	6.86	6	10.29
B	B	5,066	0	0	1	1.97	1	1.97	33	65.18
	A		2	3.95	0	0	2	3.95	4	7.90
C	C	5,210	1	1.92	3	5.76	4	7.68	2	3.84
	A		2	3.84	2	3.84	4	7.68	0	0

TABLE 6. *Comparison of activity of tuberculosis as diagnosed by originating and rereading stations and by referee reader*

Activity of tuberculosis	Readings of films from station A								
	A	B	Referee	A	B	Referee	A	B	Referee
Active	5	1	5		0	1		0	3
Questionably active		1		6	2	2		0	5
Inactive		3			1	2	18	5	6
Nontuberculous					3	1		13	4
	A	C	Referee	A	C	Referee	A	C	Referee
Active	3	2	3		0	1		0	3
Questionably active				2	1	1		1	2
Inactive					1	0	11	5	4
Nontuberculous		1	0					5	2

TABLE 6. *Comparison of activity of tuberculosis as diagnosed by originating and rereading stations and by referee reader* —Continued

Activity of tuberculosis	Readings of films from station C								
	C	A	Referee	C	A	Referee	C	A	Referee
Active	1	1	1		1	0			
Questionably active				3	2	3		0	1
Inactive							2		
Nontuberculous								2	1
	Readings of films from station B								
	B	A	Referee	B	A	Referee			
Active		1	0		1	3			
Questionably active	1	0	1		0	4			
Inactive				33	4	1			
Nontuberculous					28	25			

TABLE 7. *Comparison of extent of tuberculosis as diagnosed by originating and rereading stations and by referee reader*

Extent of tuberculosis	Readings of films from station A											
	A	B	Referee	A	B	Referee	A	B	Referee			
Minimal	21	5	13								1	0
Moderately advanced		2	3	6	2	6						
Far advanced					2	0	2	1	2			
Nontuberculous		14	5		2	0						
	A	C	Referee	A	C	Referee	A	C	Referee			
Minimal	12	7	10		1	0						
Moderately advanced		0	1	3	2	1						
Far advanced					0	2	1	0	1			
Nontuberculous		5	1					1	0			
	Readings of films from station B						From station C					
	B	A	Referee	B	A	Referee	C	A	Referee			
Minimal	31	2	5		3	1	6	1	2			
Moderately advanced		0	1	3	0	2		3	3			
Nontuberculous		29	25					2	1			

"nontuberculous" 29 of 31 films interpreted by the station B reader as exhibiting "minimal tuberculosis." The referee reader read 25 of the 31 cases as nontuberculous. Otherwise the referee's disagreement with the original reader was not great. It is obvious that in some categories the number of cases diagnosed is too small to permit valid comparisons.

INTERPRETATION OF NONTUBERCULOUS LESIONS

The abnormalities to which attention was directed are listed in figure 1. As it happened, certain pathologic diagnoses were made so rarely in the 20,973 films that they need not be considered further in our comparative analysis of readings. "Tumor" was never diagnosed by an examining station roentgenologist. "Sarcoidosis" was diagnosed only once by a station roentgenologist, although somewhat more frequently by the referee reader. "Wet pleurisy" also was diagnosed only once. "Dry pleurisy" was diagnosed about 12 times, and it is interesting to note that the rereading roentgenologist was generally in agreement with the original reader in interpreting this lesion, the diagnosis apparently being restricted by all the roentgenologists to pronounced pleural thickening.

This leaves us "calcification," "heart disease," and a few other lesions to consider. For this purpose we may include the several nontuberculous lesions rarely diagnosed, as noted above, in the final figures as "other pathology."

CALCIFICATION

Agreement was low in the calcification category, and probably not much significance should be ascribed to the fact. Massive calcifications of old parenchymal and lymph-node lesions, of the type seen frequently in World War II registrants and in the middle-aged population in general at and before that time, are now apparently rare in young men, at least in the geographic region under consideration. Moreover, from the point of view of tuberculosis, much less significance is attached today to small, calcified lesions than was the case formerly. It is generally believed that in certain sections of the country many of the genuinely calcified nodules observed represent healed histoplasmosis or other nontuberculous lesions. Finally, objective criteria for distinction between small, calcified lesions and blood vessels running perpendicularly to the plane of the film are hard to define, so that wide room for discrepancy exists.

Before the interpretations in this study were started, the roentgenologists of the three examining stations read a group of films independently in the office of the responsible investigator. It was evident at the time that, in judging a small spot as "calcified," each tended to follow a pattern of his own, and because no abso-

lute criterion exists for the determination, it was impossible to decide which roentgenologist approached theoretic perfection most closely. A general discussion was held as to the principles obtaining, on which all agreed. In the light of the discussion each reader was left to follow his own judgment thereafter.

Percentage figures for diagnoses of nontuberculous lesions as well as tuberculosis are given in table 2. It is evident at once that rates for the diagnosis of calcification are low in comparison with figures obtained a decade or more ago. Diagnoses of calcification only (*i. e.*, no other abnormality) in dual reading totaled only 255, of which 57 were in agreement, leaving 198 separate diagnoses in 20,973 films examined, a figure yielding a rate of 0.94 per cent. The number of original diagnoses of calcification in films read as showing no other abnormality was 132 (in 57 of which the diagnosis was duplicated on second reading), while in films read originally as showing some abnormality other than calcification, such as tuberculosis or heart disease, 27 diagnoses of calcification were made on original reading. This yields a total of 159 diagnoses of calcification on original reading of 20,973 films, or 0.76 per cent. These figures are in marked contrast to the recorded figures of from 10 to 15 per cent that commonly prevailed a decade or more ago for men in the age range of those examined in this study. It should be noted in this connection, however, that the older figures were based principally on the reading of 14- by 17-inch films, in which calcified lesions as a rule are better defined than in the four- by five-inch photoroentgenograms.

The relatively high figure for diagnoses of calcification made from station B films, on which the station B and station A roentgenologists agreed, calls for special comment. It is possible that calcifications representing healed fungus disease as well as primary tuberculosis swelled the number, for it has been reported[13] that exceptionally high rates of reaction to histoplasmin prevail in a region generally south and southeast of station C. This region of apparent histoplasma infection probably includes the station B area. It is now generally believed that abnormally high rates of calcification, in regions where reaction to histoplasmin is frequent, represent healed histoplasmosis.

Otherwise the figures for calcification are not believed to be of great significance. They are low, as noted, and in general, except in the case of the station B films, diagnostic agreement in duplicate reading was poor. The roentgenologists themselves stated that in their own judgment the diagnosis was frequently equivocal. On the whole, the impression was gathered that, unless a decidedly different picture of calcification is seen in other parts of the country, pulmonary and hilar calcification will no longer pose an important problem in Armed Forces examining stations.

HEART DISEASE AND OTHER LESIONS

Opinions differ on the value of photoroentgenograms in the diagnosis of heart disease. It is generally conceded that these films fall much short of standard six-foot 14- by 17-inch films in defining heart size in relation to chest diameter.

Agreement on the diagnosis of abnormal heart size or contour in the films doubly read in this study was irregular but to some extent encouraging (table 2). In 4,876 station A films the station A roentgenologist diagnosed heart disease 23 times, while on rereading the same films independently the station B roentgenologist made this diagnosis only seven times. In a second group of station A films the station A reader diagnosed heart disease 16 times, while the station C reader diagnosed it 11 times. In 5,066 films made in station B, the station B roentgenologist diagnosed heart disease 21 times; the station A roentgenologist made this diagnosis 24 times in the same films. In 5,210 films taken in station C the station C roentgenologist recorded seven diagnoses of heart disease; in reviewing the same films the station A reader diagnosed heart disease the same number of times. Although a good deal of discrepancy is evident, there is room for some satisfaction. Rereading of the 67 films (0.32 per cent of all films examined) in which a diagnosis of heart disease had been made at the originating station (table 8) yielded 38 agreements (56.7 per cent) by the rereading examining station and 51 (71.6 per cent) by the referee roentgenologist. In many of these cases the hearts were of unusual size or were characteristically abnormal in contour. The conclusion seems justified that agreement as to heart abnormality by two independent readers is significant, and that cases in which such agreement occurs should be scrutinized carefully by other technics employed in more precise study of cardiac abnormality.

Not much space need be devoted to the diagnosis "other." This category was essentially a "catchall" for chest or pulmonary abnormalities not noted under specific headings. It included shadows believed to represent acute bronchopneumonic infiltrations, congenital and acquired deformities of the ribs, occasional enlargements of lymph nodes, and a few other abnormalities. Not infrequently a shadow read by one roentgenologist as representing tuberculosis would be read as "unclassified" by another under the impression that the shadow in question represented an acute, nontuberculous inflammatory process. No facts of special significance were learned in analyzing diagnoses of pathologic conditions other than tuberculosis, and it may be assumed that, in making final decisions in persons with suspected pulmonary lesions in this category, examining physicians would be guided by many features of the examinations besides the roentgenogram.

TABLE 8. *Agreement in diagnoses of heart disease made by originating, rereading, and referee readers*

Stations		Number of films	Diagnoses of heart disease by originating station	Agreement	
Originating	Rereading			Rereading station	Referee
A	B	4,876	23	9	15
A	C	5,821	16	8	14
B	A	5,066	21	15	15
C	A	5,210	7	6	7
Total		20,973	67	38	51

DIAGNOSIS OF NEGATIVITY

It will be noted in table 2 that the diagnosis of negativity ranged from 96.17 to 99.30 per cent in the eight reading operations recorded, and that if the readings of the station B films, in which a high incidence of calcified lesions was diagnosed, are omitted, the range was from 98.13 to 99.30 per cent. Thus the frequency of agreement on negativity in dual reading was very high.

In order to learn the effect of rigid scrutiny of the films read dually as negative, the referee roentgenologist made a third independent reading of 5,425 films randomly selected from the films in which the first two readers detected no abnormality.

In this large group of films, making up about a quarter of all the films examined, the referee reader made one diagnosis of active tuberculosis of moderately advanced extent, one of active tuberculosis of minimal extent, 15 of inactive tuberculosis of minimal extent, and 26 of questionably active tuberculosis of minimal extent.

If the fact is borne in mind that good roentgenologists not infrequently contradict themselves in successive interpretations of the same films, this cannot be considered a highly significant discrepancy. In fact, in the entire 5,425, only one case, read as negative by two roentgenologists and "moderately advanced tuberculosis" by the referee, calls for further comment. Presumably in this case abnormally heavy markings, which may have been inside the normal range or somewhat outside of it in density, led to the discrepancy noted. Thus, in summary, less than 1 per cent of the thousands of films read as negative by two roentgenologists were read by the referee reader as showing any sort of tuberculous abnormality, and in only a 20th of these did the referee read the supposed lesion as "active." This high degree of accord on films

read as negative is believed to establish the dual reading of negativity as of great value.

SUMMARY AND CONCLUSIONS

The study here reported was designed (1) to determine the prevalence and character of pulmonary tuberculosis in men currently being examined in Armed Forces examining stations, (2) to study discrepancies and explore advantages in dual reading of chest photoroentgenograms, and (3) to recommend procedures for chest roentgenographic examination in the future that combine the maximum reliability and efficiency possible within a practical range.

In carrying out the study the services of three armed services examining stations in the Second Army Area were employed. Chest photoroentgenograms of 20,973 men were read routinely at their stations of origin and independently by the roentgenologist of another station. All films in which findings were interpreted by either station as abnormal were checked in a third reading by a referee reader in the office of the responsible investigator.

The study was made primarily to detect the presence and estimate the severity of tuberculous lesions. It brought out the fact that pulmonary tuberculosis in men 19 to 22 years of age is less prevalent than in former years. The exact prevalence in candidates could not be determined because of the impossibility of establishing theoretically perfect readings among the many discrepant readings recorded. Original single reading of films in the stations of origin yielded a rate of 40.53 cases per 10,000 films diagnosed definitely as "tuberculosis." Dual reading of the same films gave a rate of 61.98 per 10,000 with the same diagnosis. Dual reading of all the films for the combined diagnoses of "tuberculosis" and "suspected tuberculosis," after elimination of cases diagnosed by two readers as tuberculosis or suspected tuberculosis, inactive and of minimal extent, yielded a rate of 83.44 cases per 10,000 films.

Pulmonary calcification was diagnosed with relative infrequency as compared with the prevalence reported in World War II examinations. The discrepancy in interpretation was very great, and the impression was created that pulmonary calcification should not be considered a significant item in regulations for future chest roentgenography in Armed Forces examining stations.

The procedure of dual interpretation supported the view that chest photoroentgenograms are useful in the diagnosis of heart disease. Agreement between two station roentgenologists was relatively good, and their diagnoses tended to be confirmed by the referee roentgenologist.

Discrepancy in interpretation between two roentgenologists with respect to the presence or absence of tuberculous lesions

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and their activity and extent was very great. It was so striking as to make it clear that such fine distinctions as "tuberculosis" and "suspected tuberculosis" and "active" and "questionably active" are quite impractical. Agreement was somewhat better with respect to the diagnosis of "minimal inactive" lesions. The only practical diagnosis affording sufficient range for reasonable uniformity of interpretation in dual reading seemed to be of "suspected active tuberculosis."

On the whole, dual reading appeared to confer distinct advantages. Dual reading of "negativity" of films, which in this study reached from 98 to 99 per cent, is probably significant. Less than 1 per cent of films so read by two station roentgenologists were interpreted by the referee reader as showing any kind of tuberculosis, and in only a fraction of these did he diagnose "active" disease. Past experience has shown that films read as negative by two readers are far more likely to be interpreted as negative in additional readings than are films read as negative by one roentgenologist alone. This fact is of considerable value in accepting men for service.

It was possible to estimate, in terms of manpower cost, the extra safety conferred by dual reading with respect to possible later breakdown with tuberculosis. The minimum theoretical "rejection rate," as disclosed in this study, if based on the reading of definite, active tuberculosis by a single roentgenologist, was 15.73 per 10,000 men, while the theoretical practical maximum, based on rejection of all those diagnosed by either of two roentgenologists as having tuberculosis or suspected tuberculosis of extent and severity exceeding the minimally inactive, was 83.44 per 10,000 examinations.

The authors wish to express their indebtedness to the co-operating roentgenologists of the three stations, who carried out their duties scrupulously and faithfully throughout the investigation: Dr. Franklin A. Chagan of Philadelphia, Dr. Joseph C. Furnari and Dr. A. Dougal Young of Baltimore, and Dr. Francis B. Markunas of Harrisburg. Our thanks are due also to Mrs. Kathryn Reinhardt for meticulous care in the assortment of cards and transcription of records.

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The Office of The Surgeon General, Department of the Army, is currently accepting and reviewing applications for the Military Preventive Medicine course (8-0-37) and the Military Medicine and Allied Sciences course (8-0-38) which are conducted at the Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C.

General information concerning these courses is contained in Department of the Army Pamphlet 20-21, The Army School Catalog, June 1954.

Regular officers of the Medical Corps who are interested in attending these long-term courses during Fiscal Year 1957 may obtain further information by direct communication with the Surgeon General, Attention: Chief, Personnel Division.

PILONIDAL CYST

Misnamed, Misunderstood, and Mistreated

ROBERT M. HARDAWAY, *Lieutenant Colonel, MC, USA*

PILONIDAL cyst is a tremendous military problem. Civilian physicians entering the armed services are astounded at the number of cases seen in military hospitals and dispensaries in contrast with civilian institutions. During World War II (from 1942 to 1945), 77,637 Army patients were admitted to medical treatment facilities for pilonidal disease, and 3,387,000 man-days were lost.[1] Assuming $15.00 a day hospitalization cost, and $15.00 a day for loss of a day's duty, the cost was over 100 million dollars for hospitalization for pilonidal disease in World War II. Over 9,000 other patients with pilonidal sinus, in whom this disease was not the immediate cause of admission, were admitted to the hospital. Also, this does not include the hundreds of thousands of clinic and dispensary visits, and the tremendous expenditures of time and expense which they involved. In 1953 there were 4,955 Army patients admitted to medical treatment facilities for pilonidal disease, and 121,000 man-days lost. The rate (per 1,000 average Army strength per year) of admission to the hospital has increased from 3.05 during World War II to 3.24 during 1953.

The medical officers of the Army have had more experience with pilonidal disease than any other group because (1) pilonidal sinus is a disease primarily of young men, and (2) conditions of Army life are conducive to infection of a previously uninfected cyst.

The pre-World War II treatment of pilonidal sinus was excision when infection had been controlled. I performed 144 excisions of symptomatic pilonidal sinus in 17 months prior to World War II with over 90 per cent primary healing. The results seemed good at the time, and seemed to warrant excision of controlled but previously symptomatic pilonidal disease.

However, during the years following, chance or intended follow-up on many of these patients with "good" results showed that most of them had recurrent trouble since the first operation.

Similar results were experienced in the Army as a whole. Although initial results in most properly prepared patients were

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fairly good, a large proportion had further trouble. It was not uncommon to see large numbers of patients with pilonidal disease occupying many hospital beds for long periods of time and performing little or no military duty during their entire Army careers. What was wrong? Careful operation seemed to completely excise the "cyst" and its chronically infected granulated tissue lined sinus tracts, but still "recurrences" were common. No method of excision seemed to prevent them, although the types of operations for pilonidal sinus were almost as numerous as the number of surgeons performing them. Attempts to obliterate dead space, preserve normal tissue, cover the sacrum with fat-padded skin, eliminate buried suture material, and other good surgical principles seemed to have no dramatic effect.

In 1946 the first of a series of papers[2-7] appeared showing that hair, when introduced into a skin cleft which is constantly in motion (*i. e.*, between the fingers) could erode through the skin and form a sinus tract which remained open by the constant foreign body reaction of the hair. Some of these sinus tracts were lined by squamous epithelium which simulated a hair follicle. (Hair follicles do not normally occur between the fingers.) It was postulated that hair in the interbuttock cleft could be sucked into the opening of a "pilonidal cyst" by the constant compression and decompression of riding in a jeep or other vehicle.[4] This brought to mind the fact that while hair is seen protruding from about half of infected pilonidal cysts, it always lifts out easily. Also, while hair is so frequently present in the tract, hair *follicles* are seen with much less frequency in the tract than in the surrounding skin, and when seen are frequently degenerating or otherwise abnormal, apparently due to the infection. Few if any of these follicles show a cup-shaped "root" at the bottom, and one wonders if these are real follicles or small tracts along the hair into which epithelium has grown. Infected pilonidal cysts are often seen in hairy persons with deep intergluteal clefts, and soon after puberty (figs. 1 through 4). All this seems to point to the fact that hairs seen protruding from a "pilonidal cyst" are frequently sticking *in* and not *out*.

No one denies that the disease is congenital, that the tract is an epithelium-lined sinus, possibly resulting from defective closure of the neural groove. However, the time (after puberty) of initial infection of the tract and the frequent "recurrence" after adequate excision points to ingrowing hair as a major problem. In addition, in perfectly normal persons with no congenital sinus, it is known that poor personal hygiene, sweat, and irritation will produce a painful, tender inflammation in the intergluteal fold.

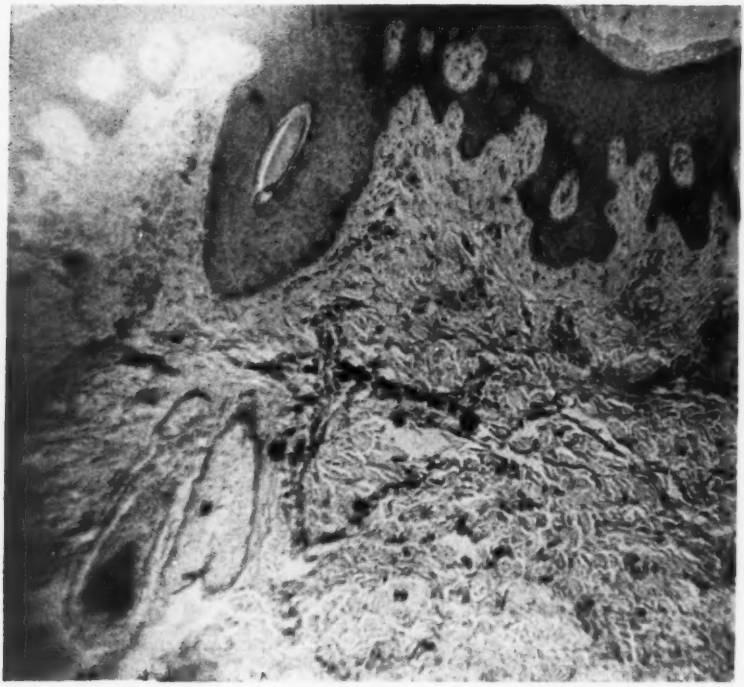

Figure 1. Section of skin near the orifice of a pilonidal sinus. Note the close spacing of the hair follicles and the cup-shaped root at the bottom of the follicles. Note hair follicles are roughly perpendicular to the skin surface and sebaceous glands are present.

Kleitsch and Cherry[8] explain the "pilonidal sinus habitus" as follows.

"1. Young adult: skin changes due to sex hormones and the development of secondary sex characteristics.

2. Male: narrow pelvis and deep intergluteal cleft. Less careful personal hygiene. Greater tendency to hairiness. Occupation which produces sacrococcygeal trauma.

3. Hairy: increased capillarity of internatal cleft, hyperhidrosis.

4. Acne: increased glandular activity of skin, susceptibility to staphylococci infections.

5. Obese buttocks: deepened intergluteal cleft. Greater tendency to fecal contamination by capillarity from anus.

As the infection in the depths of the sinus progresses, it crosses and destroys the epithelial barrier and enters the fatty,

Figure 2. Section through a pilonidal sinus. One of the rather rare hair "follicles" is seen with a degenerating hair in its center. Note that the follicle is not of the usual appearance, and appears to run parallel to the epithelium lining the sinus. No cup-shaped root was identified in the sections. No sebaceous glands normally associated with hair follicles can be found. Could this be a sinus tract around a foreign body hair into which squamous epithelium has grown?

subcutaneous, episacral tissue. This invokes a fibrous reaction in the fat and produces the so-called pilonidal cyst, which is, in fact, a granuloma at the end of the sinus tract."

Once infection has started, it burrows in much the same fashion as a fistula in ano or hidradenitis suppurativa. In fact these two conditions are sometimes difficult to differentiate from an infected pilonidal sinus.

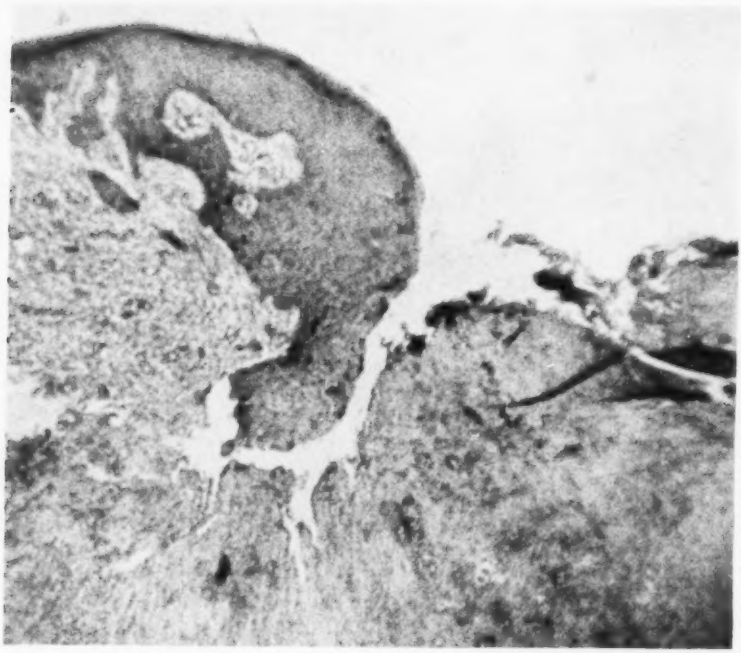

Figure 3. Pilonidal sinus tract at a point where the epithelium has been destroyed and infection has started to burrow into the surrounding tissue. Note infected granulated tissue.

With these facts in mind the following regimen is recommended for managing persons with pilonidal disease in the military service.

1. Meticulous personal hygiene. Thorough soap and water cleansing of the intergluteal area daily. Use hexachlorophene detergent if possible. After a bowel movement clean the anal area with movement away from the intergluteal area, not toward it. Keep the area as dry as possible. Advise weight reduction in the obese person, and upright sitting with no slouching on the sacrum.

2. Shaving of the intergluteal area whenever infection is present or threatens, especially in summer, on field problems, et cetera.

3. A permanent profile stipulating that they not be assigned as drivers or routine passengers in a vehicle (Military Police duty, et cetera).

4. Incision and drainage of abscesses, sitz baths, broad spectrum antibiotics, curettement and/or minor excisions in certain cases.

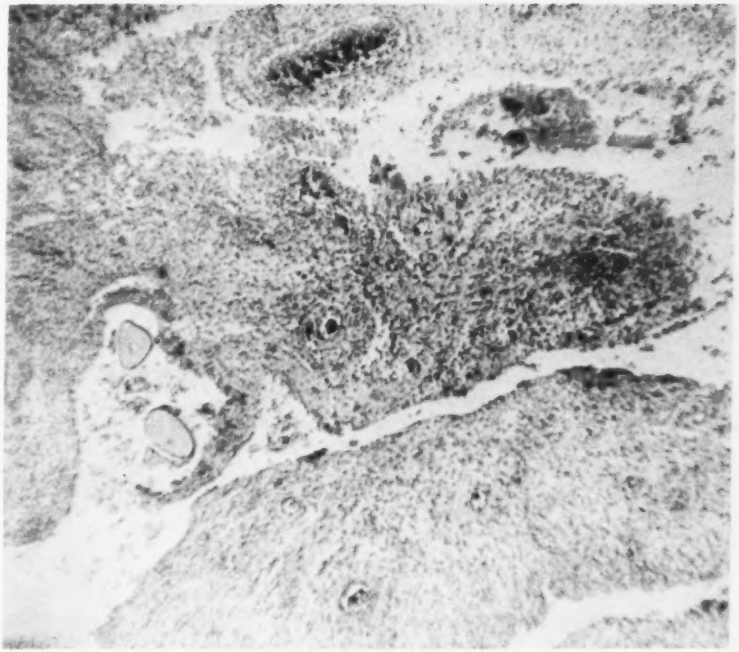

Figure 4. Pilonidal sinus with no epithelium remaining. Note hairs in the cavity of the sinus.

5. Definitive surgery is reserved for those few persons who (a) have had a failure of an *adequate* trial of the above-described treatment, and have required repeated hospitalization; (b) are in the regular service; (c) have had satisfactory service for a period of time; and (d) who signify their intention to remain in the regular service.

Excision should be done only after drainage and inflammation have been controlled by sitz baths, proper surgical drainage, shaving of the area, cleanliness, and antibiotics of the wide-spectrum type. Excision should remove only diseased tissue. Whether to do a primary suture or tack down the skin, leaving an open wound, should be determined by the size and ramification of the sinuses.

If excision is decided on, the patient should be informed that his chances of having subsequent trouble are altered little by the operative procedure, and that his best chance of avoiding relapses is by careful adherence to the previously described regimen. As a matter of fact, the most difficult cases to control are in those patients who have had a previous excision.

SUMMARY

Pilonidal "cyst" is not a cyst but a congenital sacrococcygeal sinus with added infection and granuloma or abscess. "Recurrences" and infection of "cysts" are usually due to poor personal hygiene, trauma, and ingrown hair. Treatment is usually best carried out by proper management and not by excision.

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THE GROWTH OF MEDICAL LITERATURE

"Other reasons for the mushroom growth of literature are that publications are important to an individual who hopes to rise in the academic world. A bibliography helps in Specialty Board certification, which in turn gives one some advantages in military and Veterans Administration positions, and materially improves hospital staff appointments. These, plus local prestige all lead to conscious or unconscious pressures to 'write papers.' This striving for recognition leads in some instances to the pernicious premature announcement of clinical and laboratory 'data.'

"Furthermore, the development of many medical societies in recent times has often resulted in an 'organ' which reports papers presented at meetings. Many medical societies (small in membership although homogeneous in interest) for one reason or another soon find themselves in the journal business."

—S. O. WAIFE, M. D.
in *Annals of Internal Medicine*
pp. 910-911, Oct. 1955.

SOME PSYCHOLOGIC INDICATIONS FOR PLASTIC SURGERY

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IT is often said or implied in a variety of ways in the literature that the indications for plastic surgery are self-evident. The patient seeking the correction of some gross deformity who finally drums up enough courage to enter the general practitioner's or surgeon's office, often "in extremis" from the anxiety engendered by contemplating this visit for months, is perhaps among the minority of such persons in dire need of surgical correction. Of course, in these patients, with their expressed wish for correction and their obvious need for such correction, the indications are usually self-evident.

But what of others who are seen every day in offices and clinics with a variety of complaints other than their deformities, but without an adequate adjustment to or acceptance of their defects? How many patients with obvious or not so obvious physical malformations or acquired defects are observed in an office practice in a few months' time? How many of them are not adjusting well to their life situations? How many are frankly unhappy? Could there be some relationship between their lack of adjustment or unhappiness and their physical defects? How many times are these patients seen for minor complaints or rather tenuous symptoms? Could it be that they are hoping, possibly praying, that the physician will help them by tactfully noticing the defect and suggesting that, whether real or alleged, it can be helped or eradicated by plastic procedures? Using a compilation of the literature as a reference, this article relates to those carefully selected patients whose indications for plastic repair are not so obvious, but whose ultimate surgical and psychologic result may be as gratifying as that of those whose indications are apparent to all.

GENERAL CONSIDERATIONS

In the consideration of these patients, one is again struck by the necessity for treating the whole patient, but it must be realized that the exposed portions of the body assume the greatest

From Madigan Army Hospital, Tacoma, Wash.

significance in the patient's relationships with others.* Consider the woman with a disfiguring scar on her forehead or neck, "lop" or malformed ears, et cetera, and how carefully the hair is arranged to cover these defects. Could the time spent in achieving this effect be any more eloquent proof of the importance the defect assumes in the woman's mind?

Of the portions of the body exposed to full view, the hands, head, and neck are the most prominent, and if defects in appearance and function of these parts make it impossible for the person to compete with his fellow men on an equal footing, it is not rare for him to become asocial, if not actually antisocial. Even the association of criminal behavior with such bodily defects is not unknown.[2]

Most normal people have an inherent desire to look their best, particularly to those people who are most closely associated with them, and this desire can be called vanity only when it becomes a need for indiscriminate admiration.[3] Because every person reacts psychologically to his own physical appearance, consciousness of a physical defect, particularly if the defect is congenital or acquired in early life and regardless of its severity to the eye of the casual observer, tends to disrupt normal personality development. In our present society, due to keener social and occupational competition and more thoroughly developed esthetic sensibilities than ever before, a great need for treatment of disfigured people becomes apparent. These people are as truly sick as any other ill person, for there is no deformity that does not produce some pathologic personality and adjustment patterns. It is true that individuals differ in their sensibilities to their own defects, and some may apparently be heedless of them, but it is obvious from the innumerable examples in the literature that the apparent heedlessness is but a thin mask covering deep-seated psychic distress. It is also often apparent that persons with defects which are impairing their success are unaware of the reason for their inability to progress at the rate their obvious abilities lead them to expect. Friends and acquaintances hesitate to mention these conditions, and the person is at a loss to account for his difficulties.

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*Exposed portions, in this sense, must also include those portions of the body configuration that are apparent through the clothing: the breasts, hips, spinal curvature, waist, shoulders, and proximal bony and soft tissue portions of the extremities in women; and the shoulders, hips, waist, spinal curvature, breasts, and proximal extremities in men. However, unless so grossly deformed as to need orthopedic, general medical, or large-scale plastic surgical intervention, these conditions of covered areas are not of paramount importance to the type of patient we are discussing and do not usually fall into the province of the plastic surgeon. With the present-day mode of dress, many minor defects of body configuration can be concealed adequately by proper padding, supporting devices, or a good corset, and will not be considered here.

THE PHYSICIAN'S ROLE

What can and should be the role of the "family physician" in relation to these people? By definition, if he is a "family physician," the people in his community have come to regard him as a man capable of advising and treating their families, and an interest in and a tactful approach to the medical, social, and psychologic problems of the people in the community are the prerequisites the physician must have before receiving the "family" title. He is, therefore, in the best possible position to recognize the needs of such patients and to treat such of their ills as lie within his capabilities and interests.[4] He may refer the more difficult defects to those who have given the field of plastic surgery special study and who possess the artistic skill so necessary in achieving the esthetic results needed in cosmetic surgery.

When a physician observes a patient with a physical defect affecting his appearance, he is meeting a physically abnormal person in a psychologically normal situation. Any mental condition, with certain exceptions, that the patient has developed as a result of the cosmetic defect is one that would have developed in any normal person desiring social approval in spite of defective physical appearance. Nor is there any more "disgrace" in having such a defect removed than there is in having other disease conditions treated. The disgrace, if such exists, is to allow a symptomatic and correctible deformity to remain untreated. As Berndorfer[5] has so aptly said, "The curative treatment of the physician does not consist of overcoming the illness alone or of preventing it, but also of suggesting to the patient the wish to be healed."

INFANCY AND CHILDHOOD

In general, indications for plastic surgery in infancy and childhood are self-evident, consisting predominantly of repair of harelip, cleft palate, large and disfiguring birthmarks, other severe congenital anomalies, et cetera, and do not involve the more subtle indications discussed here.[6] Certainly the correction of such defects in infants may be of extreme importance in enhancing the child's acceptability to its parents, a factor of extreme psychologic importance. The time of, and following, the awakening of social consciousness in childhood may be the time in individual cases to prescribe elective plastic surgery.[7,8] Familiar and unthinking childish expressions such as "monkey face," "squinty," "one-eared Dago," "fish face," "dog ears," et cetera, directed toward playmates with disfigurements may be a constant torture to the recipient,[9] and surgical correction at this time may prevent the development of a mental defect marring the

person's entire life and proving extremely difficult to heal.[5] It may be said that this period is the optimum time for such correction, the personality being still in its formative stage, without "overtones of sophistication" and most easily adaptable to the altered "body image"* following corrective plastic procedures. Of course, ill-advised, poorly timed, or inadequate surgical intervention at this age can lead to undesirable results or to a more severe postoperative deformity, necessitating later cosmetic surgery to repair the damage.

ADOLESCENCE

During adolescence and early adulthood much of the thought processes are used in establishing the person's individual identity.[10] With this period comes a renewed preoccupation with the body and its appearance. Adolescents and young adults are often self-conscious, immature, and socially inadequate. Being exceedingly preoccupied with their appearance, they compare themselves disadvantageously with their fellows and may rationalize to themselves that, "If I were as good looking as the others, I'd also be popular." When the reality of a disfigurement is added to these thought processes, the adolescent may resort to all types of unconscious subterfuge in trying to fit the defect into his "total body image." He may deny the existence of the disfigurement or resort to feelings of unreality or depersonalization.[11] There may, as a part of this picture, be very unrealistic plans for a future vocation, *i. e.*, as a beautiful movie actress. This struggle with self is a painful experience for the adolescent, and always of an individual nature. If the adolescent accepts his disfigurement, the youthful society in which he finds himself may be a constant source of psychologic disturbance, the jibes of his fellows again a constant torment. His problem often resolves itself into the statement, "People look at me," which expresses the ambivalent attitude of being "seen at all" as opposed to the realistic concept of actually being "looked at." In this age group, the face generally assumes primary importance, as do its defects. The face is the superficial symbol of the entire person, including the personality; but at the developmental level where individual identity is in a formative stage, the symbol may be all that is representative of the person in the owner's mind.[9] Thus, defects in this age group assume an importance out of proportion to that attributed to them by the superficial adult observer.

The nose is the most conspicuous feature of the face,[12] and rejection, ridicule, or discrimination on the basis of an unesthetic nose is one of the most commonly observed reactions in this youthful population. It is not only a target for undesired attention,

*A concept expressing the picture each person has of himself and his own body.

but is also apt to produce deprecatory or disquieting self-consciousness in its owner.[12,13] Although the nose can vary widely in size and shape and not be termed abnormal, each nose must possess some harmony with its surrounding features and contribute to the total facial symmetry.[12] As an example of the latter, not infrequently a short or an oversized chin is the real but unrecognized offender.[10] These unfortunates should be considered as subjects for plastic correction according to the impression the defect makes on its owner, his general condition, and the ease with which the correction can be accomplished,[4] provided that, after a tactful introduction to the subject by the physician,[14] the prospective patient is seriously and deeply desirous of having the correction made. A thorough understanding of the possibilities for and limitations of rhinoplasty should also be imparted during the discussion with the patient.[15] Other defects in appearance, particularly of the face, in this group can be approached in a similar manner, to the gratification of both the physician and the patient.

EARLY MIDDLE AGE

In the young and middle-aged married group, the role of the wage earner is predominant. Deformities of the hands such as webbed fingers, loss of fingers, deformed nails, scar contractures, et cetera often directly impair the earning ability of the person as well as produce psychic trauma.[16,17] These are examples of loss of function increasing the conspicuousness of a physical defect. The surgical implications of lesions such as these, that definitely and permanently affect the economic and social value of the individual, cannot be denied as long as surgical possibilities exist for their correction. To pursue this point a bit further: In denying the validity of this obligation or in professing a disinterest in it, surgical indications in general and the physician's pronunciations in particular are not only contrary to the social scheme of things, but inconsistent with the progress being made in other branches of medicine. Constant progress in surgery can be maintained only as long as the application of its principles, discoveries, and possibilities keep pace with the needs of the individual person and of society.[18]

Some persons in this and in older age groups will look on the deformity as "God's will and accept it as such; some feel that it represents a punishment for earlier transgressions, while others will show evidence of conscious and unconscious guilt feelings that are assuaged by the disability."[11] When treating such a patient, the physician will do well to proceed cautiously and very tactfully in his suggestions for repair, for he may be disturbing a psychologic adjustment to or dependence on a disability that,

although precarious, has served the individual fairly adequately, and its loss may precipitate a great deal of free-floating anxiety.

LATE MIDDLE AGE

Patients in the late middle-life and early senility age groups, as well as some in the preceding group, have wrinkles and crow's-feet about the eyes, sagging of the skin of the face, double chins, et cetera. These are of insidious onset, but eventually are recognized as disfigurements by being brought to the attention of the individual in such a way that the removal of the circumstantial evidence of beginning antiquity would certainly be desired if the possibilities for repair were known. The wrinkles, bags, and folds resulting from the stretching of the skin of the face as middle life advances give the appearance of age or, worse, premature age, and can produce a great deal of mental anguish in susceptible persons. Not uncommonly a woman in this age group wishes to maintain a deception as to her age. This is not necessarily vanity, for on careful questioning it may be found that she fears losing her husband or lover should he discover that she is his senior. In this case, her appearance influences her prospects for maintaining or achieving marriage, and certainly warrants the attention and help of the physician. Facial surgery for the removal of these defects usually results in making the individual appear 5 or 10 years younger, and the change is realistic enough to account for an almost universally happy response.[10] For certain reactive depressions, not including actual involutional depressions, the reduction of severe, aging wrinkles has produced a marked resurgence of the patient's interest in living and a good prognosis for adequate psychologic readjustment.

Scars and deformities following the removal of cancers and other new growths are occasionally incurred by a member of this group, who may believe that the defect is a brand of this unfortunate former condition that causes people to shun his company. Removal of the disfigurement and rebuilding the lost parts restores the person's mental as well as physical well-being.

In this group, too, is often found the retiring, passive, apologetic person who finds his psychologic adjustment through humility and forbearance, and who is everlastingly thankful for any interest or aid given or offered for the correction of his physical defects.

PSYCHOLOGIC CONTRAINDICATIONS

A short review of psychologic contraindications is appropriate. The literature has many examples of these.[4, 6, 19–21]

When a person possesses a true disfigurement, there may be a tendency to project on the defect whatever difficulties and set-

backs are encountered in daily living.[9, 20, 22] In casting about for a plausible basis for rationalization, those people who have a basic personality inadequacy, are unable to assimilate and digest the demands and restrictions of their environment, or fail to measure up to their apparent opportunities, may discover some minor defect such as a mole, acne scar, freckles, a long lip, or an unequal nostril. From this they build an all-inclusive rationalization of their difficulties, out of all proportion to the reality values of the defect. There also may be unconscious meanings given to these deformities. Any plastic repair serves only to interrupt the rationalization process, and soon the resulting scar or another trivial defect is seized on for continuation of the delusional and illusional construction, this construction or behavior pattern often being frankly schizoid. In view of the seriousness of many of their problems, any acceptance of suggestions for operation by these people may be a final defensive maneuver before a truly decompensated neurosis develops, and it is wise to proceed with extreme caution in advising such procedures. Specific contraindications for cosmetic surgery in evaluating a person might be: (1) motives that are confused, vague, or unconvincing; (2) complaints that are not justified by the defect's appearance; (3) defects causing most concern being minor by comparison to more noticeable defects that the patient apparently ignores; (4) expectations of results that are excessive or obscure after adequate explanation; (5) surgical prognosis that does not meet the patient's expectations; (6) pressure from others for an operation without giving the patient an opportunity to discuss his real feelings as to his desires or his convictions that operation is necessary; (7) consistent failure of previous plastic operations to satisfy the patient; (8) history of hypochondriasis with requests for surgical procedures of various types without adequate cause; or (9) history of consistent and severe maladjustment to life's situations, of projecting difficulties in general outside of himself and without insight into his own part in them, or of severe past psychiatric disturbance.[19, 20]

CONCLUSIONS

Persons who have deformities, even though slight, to which they are sensitive, isolate themselves psychologically by erecting a mental barrier. To remove the deformity is to remove the barrier also. Unless removed, such defects can make the person introspective and increase their hypochondriacal fancy. As a result of physical defect people may become social and economic losses to their community and to themselves. The "family physician" might well have in his thoughts a phrase of Bettman's[16] during the inspection and evaluation of any patient who seeks his aid: "A large and noticeable defect offers no inconvenience or psycho-

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logical reaction, or hindrance to our success or well-being when on someone else's face."

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THE CAUSES OF EPIDIDYMITIS

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SPURRED by discussion in the "Queries and Minor Notes" section of the *Journal of the American Medical Association*[1, 2] concerning the etiology of epididymitis, I decided to review my own clinical material. The need for such a study became apparent when a thorough survey of the literature disclosed that no similar investigation had appeared since Lynn and Nesbit's[3] article in 1948, which was limited to epididymitis following transurethral prostatectomy.

Briefly, the following factors are now considered the most likely basic causes: (1) retrograde urination—*i. e.*, pressure on the distended bladder forcing urine up the vas deferens, producing an aseptic lesion;[2-6] (2) infections in the posterior urethra, prostate, and seminal vesicles, the infection propagating along both the vasal lumen and perilymphatics;[1-6] (3) remote infection that metastasizes to the epididymis;[4, 7] and (4) trauma.[4] The authenticity of the last-mentioned cause is questioned by many urologists.[2]

MATERIAL

A study was made of 164 patients with acute and 25 patients with chronic epididymitis. Of these, 139 were seen between 1 January 1951 and 30 November 1953 at the 141st General Hospital, Japan, and 50 were seen at the U. S. Army Hospital, Fort Sill, Okla., between 2 February 1954 and 31 March 1955. At the 141st General Hospital, 152 men with painful scrotal swelling were hospitalized on the urologic section with diagnoses of (1) epididymitis, (2) epididymo-orchitis, or (3) orchitis, in that order of frequency. In 127 of these the admitting diagnosis of epididmyitis was confirmed. The other 25 were found to have one of the following lesions: seminoma (1), teratocarcinoma of a testis (1), torsion of a spermatic cord (4), traumatic hydrocele (3), idiopathic hydrocele (4), hematoma of a testis (1), hematomata of testis plus epididymis (2), varicocele (8), and abscess of scrotal wall (1). Epididymitis also developed in six patients hospitalized with urethral stricture (1), hemorrhagic cystitis (2), and for an operation (3). Six other men who had epididymitis were admitted with diagnoses of ureteral stone (1) and inguinal hernia (5). At U. S. Army Hospital, Fort Sill, Okla., 57 men were admitted with the diagnosis

From 141st General Hospital, Japan, and U. S. Army Hospital, Fort Sill, Okla.

of epididymitis. Of these, 49 had the disease, 5 had varicoceles, and 1 each had torsion of the spermatic cord, orchitis of mumps, and inguinal hernia. The fiftieth patient with epididymitis was admitted because of a testicular tumor.

PRESUMPTIVE ETIOLOGY

Idiopathic. In 76 (46.3 per cent) of the 164 patients with acute epididymitis (table 1), there was no apparent cause, and it seemed possible that the disease had been precipitated by a retrograde flow of urine. In only nine was a history of unusual activity preceding the onset of symptoms elicited. Nineteen of the patients were febrile when first observed. The temperature was never more than 102°F and rarely persisted above normal more than 24 hours. The hematologic findings were usually normal except for an infrequent, mild leukocytosis or a trifling increase in the sedimentation rate. Repeated urinalyses disclosed nothing significant. Evidence of chronic prostatitis was found in 14 (18.4 per cent) of the 76 patients, this incidence being less than half that found in troops at large.[8] The epididymitis usually was limited to the globus minor, and the entire epididymis was involved in only six cases. None had induration of the vas deferens. Five patients were found on admission to have an acute hydrocele in addition to epididymitis; there were no other complications.

TABLE 1. *The probable causes of acute and chronic epididymitis in 189 patients*

Probable cause	Acute		Chronic		Total	
	Number	Percent	Number	Percent	Number	Percent
Idiopathic	76	46.3	14	56.0	90	47.6
Acute respiratory infection	60	36.6	0	0	60	31.7
Lower urinary infection						
Acute cystitis	11		0			
Nongonococcal urethritis	7		4			
Gonorrheal urethritis	1		0			
Urethral stricture	1		0			
Postoperative infection	3		0			
	23	14.0	4	16.0	27	14.3
Chronic granulomas						
Tuberculosis	0		5			
Boeck's sarcoid	0		1			
	0		6	24.0	6	3.2
Trauma	5	3.1	1	4.0	6	3.2
Total	164	100.0	25	100.0	189	100.0

All of these patients were treated with bed rest, elevation of the scrotum, and analgesics as needed. Resolution occurred in

from 2 to 8 days; the mean was 5. Average length of hospitalization was 6 days. In 9 cases there was no residual induration, while 39 patients had slight thickening of the globus minor and 22 had moderate proliferative fibrosis of the globus major. In six instances the degree of resolution was not reported. Four of the hydroceles subsided spontaneously. The fifth ultimately required excision; at operation the testicle was grossly normal.

There were 14 patients with chronic epididymitis in whom the cause could not even be surmised. All of these patients stated that their initial attacks had been treated on an ambulatory basis. Four were admitted because of a complicating hydrocele, which was excised. The other 10 came in because of recurring episodes of pain and swelling induced by walking, running, or any activity that jarred the scrotum. In five of these, epididymectomy was considered necessary. In none of the nine patients operated on was there evidence of present or previous involvement of the testicle.

Acute Upper Respiratory Tract Infection. All of the 60 men who had epididymitis associated with respiratory tract infection were ill. Fifty-five had fevers ranging from 100° to 104.6°F; 29 had both physical and radiologic evidence of a pneumonitis; and all gave a history of an acute upper respiratory tract infection preceding the onset of the epididymitis. (See case 2.) In almost all, the process was limited to the globus minor, which was swollen and exquisitely tender. Twelve of the 60 had evidence of prostatic congestion. The hematologic findings were usually within normal physiologic limits, and repeated urinalyses were invariably negative.

Forty-one of these patients were treated with bed rest alone and 19 with bed rest and a broad-spectrum antibiotic, but no appreciable difference was noted in the response. Resolution of both the respiratory and epididymal processes occurred in 7 to 13 days, the mean being 10. Hospitalization averaged 12 days. There was no residual fibrosis of the epididymis, and neither pulmonary nor intrascrotal complications occurred.

Lower Urinary Tract Infections. Of the 189 cases of epididymitis, 27 (14.3 per cent) were secondary to lower urinary tract infections. Table 2 shows that in 3,083 cases of all types of lower tract infections, the complication of epididymitis occurred 20 times, an incidence of 1 in every 154 infections. The incidence was even lower in nongonococcal urethritis alone (1 to 567), and in gonorrhea alone (1 to 625). Although an ascending spread of the infection was also infrequent, it nevertheless occurred three times as often as epididymitis.

All 27 patients in this group were ill, with temperatures ranging between 101° and 103°F. The epididymides were hot, hard, swol-

len, and remarkably tender. The process was limited to the globus minor in 8 patients, involved the body as well in 12, and the entire structure in 7. Hydrocele was also present in 8 cases.

TABLE 2. *The incidence of epididymitis as compared with other genito-urinary complications in various lower urinary tract conditions*

Lower urinary tract condition	Number of cases	Complications			
		Posterior urethritis	Prostatitis	Ascending infection	Epididymitis
Acute cystitis	96*	73	73	34	11
Nongonococcal urethritis	2,267	165	165	10	4
Gonorrheal urethritis	625	3	3	0	1
Strictures	76*	19	19	12	1
Ruptured urethra	19**	18***	17****	6	3
	3,083	278	277	62	20

*Covers entire series.
**Covers period from 1 January 1951 to 30 November 1953.
***One patient's posterior urethra was destroyed by injury.
****One patient's prostate was removed in repairing his shattered urethra.

All of these patients, except one whose prostate had been removed during an extensive urethroplasty, had turgid, hot, tense prostates. Nine had urethral discharges, which usually were thin, watery, and scant. Severe pyuria was demonstrable in the multiglass test. Hematologic findings were high leukocyte counts and rapid sedimentation rates.

Response to either bed rest or bed rest and antibiotics was poor. In four patients there was dense scarring and persistent chronic epididymitis. In eight patients surgical intervention was required. Suppuration necessitated an orchiectomy in one and an epididymovasectomy[9] in another (case 3). In a third, a neoplasm was considered because of failure to resolve, and an inguinal orchiectomy was performed. In two other cases epididymovasectomies were performed because of extensive fibrosis. Four of the eight patients with hydroceles also required an operation (an epididymovasectomy and a hydrocelectomy were performed on the same patient—case 3). In none of these patients was the testis involved. Even the 19 patients who required no operation were bedfast an average of 17 days, and each was hospitalized almost a month.

Chronic Granulomas. Six cases of chronic epididymitis were either caused by or associated with granulomatous lesions—five tuberculomas and one Boeck's sarcoid. Although these lesions

formed only 3.2 per cent of the entire series, they comprised 24.0 per cent of the chronic cases. The tuberculomas were all long standing, involving the entire epididymis and at least 3 cm of the vas deferens. Three were complicated by large scrotal abscesses, one with sinus formation. The two without abscess formation were densely fibrotic processes. Neither the prostate nor seminal vesicles, in any of the five, presented changes suggestive of tuberculosis; but pyelograms in two of the patients who had abscesses demonstrated upper calyceal lesions on the affected side resembling tuberculous pyelonephritis. None of the five patients with tuberculous lesions had evidence of pulmonary tuberculosis. All initially ran intermittent fevers, but there was no pyuria, and the hematologic findings showed no significant deviations. Repeated cultures and guinea-pig inoculations with urine were negative for *Mycobacterium tuberculosis,* although this organism was found in all the surgical specimens.

Treatment of the five patients with tuberculous lesions was by epididymovasectomy and limited resection of the scrotum. In no case were testes found to be involved. Operation was followed by prolonged treatment with streptomycin sulfate. The scrotal wounds in all cases healed indolently. The renal lesions suggestive of tuberculous pyelonephritis that had been found in two patients were radiologically unchanged at the end of therapy; the men were therefore transferred to tuberculosis treatment centers.

The lesion seen in association with Boeck's sarcoid was more acute in onset, failed to respond to conservative therapy, and at epididymovasectomy was found to involve only the globus minor. Characteristic sarcoid infiltrations were not demonstrable histologically, although the picture was highly suggestive. This man's convalescence was uneventful.

Trauma. Six patients with epididymitis showed no evidence of lower tract infection or of congestive prostatitis. The onset in these patients had been immediately preceded by trauma—four suffered direct blows to the scrotum, the fifth had the scrotum caught in bed springs (case 1), and the sixth had received repeated, violent, jarring blows to the buttocks and perineum during the course of an afternoon. Four, whose cases were mild, were treated with bed rest alone and were hospitalized an average of only six days. One patient required epididymovasectomy (no evidence of hemorrhage found), while a second developed extensive fibrotic changes, resulting in a disabling, chronic epididymitis. This patient did not wish to have his epididymis removed.

EVALUATION OF THERAPY

The adequacy of the therapy was difficult to determine because no control series was available. However, bed rest, with or with-

out antibiotics, apparently was adequate in cases of acute epididymitis if not caused by specific organisms or secondary to lower urinary tract infection. This regimen was not attempted in the five patients with tuberculous epididymitis, and proved inadequate in 27 patients in whom the epididymitis was secondary to lower tract infection.

In 26 patients, 15 epididymovasectomies, 2 orchiectomies, and 10 hydrocelectomies were performed either for relief of symptoms or to effect a cure. In none was there evidence of current or earlier involvement of the testicle. Fourteen of the patients who had epididymovasectomies were followed for six weeks to six months, and in none did the testicle either atrophy or undergo necrosis.

ILLUSTRATIVE CASE REPORTS

Case 1. A 26-year-old man was admitted to the 141st General Hospital on 14 September 1953, complaining of a painful mass in his left scrotum for three days. On 9 September he had caught his scrotal sac in the springs of his bed. The accident had been accompanied by violent pain, nausea, and vomiting, followed two days later by the appearance of the mass. Aside from an acutely enlarged, hot, hard, tender left epididymis, a congenital phimosis, and subpreputial verruca acuminata, physical examination was normal.

Response to bed rest was inadequate. The vas deferens became indurated and hard, while pulsations in the cord became virtually imperceptible. A preoperative diagnosis of either tuberculous epididymitis or incomplete torsion of the spermatic cord was made, and the mass explored through a low inguinal-high scrotal incision on 24 September. Only a densely fibrotic epididymis was found; the testis was normal. An epididymovasectomy was performed and the scrotum closed with dependent drainage. Postoperatively, the patient was placed on 0.5 gram of streptomycin sulfate twice daily. He developed an irregular fever up to 102°F for five days. This subsided as soon as the streptomycin sulfate was stopped. Convalescence was otherwise uneventful. On 14 October the patient was circumcised and the verruca destroyed by fulguration. He was discharged on 21 October. Six weeks later (10 weeks after operation) he was asymptomatic and had a viable testis.

Histologically the lesion showed an acute inflammatory process undergoing extensive fibroplasia. There was no evidence of recent or old hemorrhage.

Case 2. A 46-year-old man was admitted to the U. S. Army Hospital, Fort Sill, Okla., on 2 November 1954, complaining of a painful swelling that had been present in his left scrotum since the previous afternoon. He stated that he had developed a "chest cold" a week or so earlier, followed, on 31 October, by generalized malaise, chills, and fever which led to his being confined at home. On the evening of 1 November, while lying in bed, he suddenly noticed a pain in his left scrotum, aggravated

by any movement. He was hospitalized early the next morning. Physical examination revealed an acutely ill, toxic patient lying apathetically in bed. His temperature was 104.2°F. A wide variety of rales were audible over the base of the left lung. The globus minor of the left epididymis measured 3 by 2 by 2 cm and was hot, heavy, and exquisitely tender. The corpus, globus major, vas deferens, and testis were uninvolved, and a full pulsation could be felt in the cord. Aside from a leukocyte count of 13,150 per μl, all laboratory studies, including a daily urinalysis, were within normal limits. A roentgenogram of the chest disclosed a diffuse, bilateral, patchy pneumonitis.

The patient was placed on absolute bed rest and 250 mg of Terramycin (brand of oxytetracycline) every four hours. An irregular, septic fever continued for four days. The swelling of the epididymis subsided more slowly, keeping the patient bedfast until 11 November. His chest was not radiologically clear until 14 November, when he was discharged. There was no residual fibrosis of the globus minor. He has not been seen since.

Case 3. A 28-year-old man was admitted to the 141st General Hospital on 27 March 1953 with a painful swelling of eight days' duration in his left scrotum. While unloading an icebox the afternoon of 19 March an assistant dropped one end of it so that the patient had to bear its full weight. He immediately experienced a violent pain in the left scrotum. The following morning a painful mass developed there. He was confined to quarters for a week, but without improvement.

The patient was under treatment at the time of his accident for a nongonococcal urethral infection. The organism, a *Micrococcus pyogenes*, was highly sensitive to Aureomycin (brand of chlortetracycline hydrochloride).

Physical examination disclosed a heavy, rather firm, 7- by 5- by 4-cm mass in the scrotum that did not transilluminate light and that masked the testicle and adnexa; a hard vas deferens and pulsating cord were palpable above the mass. The prostate felt tense and swollen. The serologic test for syphilis was positive; there was a mild leukocytosis; the sedimentation rate was 33 mm/hr; urine in glass I was cloudy and loaded with purulent shreds; in glass II it was very hazy, with occasional fine, spiral shreds, and on microscopic examination it contained large clumps of white blood cells and many red blood cells.

Response to bed rest and 250 mg of Aureomycin given every four hours was unsatisfactory, although all signs and symptoms of the urethritis and prostatitis had cleared by 31 March. On 8 April, because the cord was pulseless, the scrotum was explored through a low inguinal-high scrotal incision. A thick-walled, multilocular hydrocele filled with turbid fluid covered an abscess of the globus major. Epididymovasectomy and excision of the hydrocele were performed, and the scrotum was closed with drainage. The patient was febrile for 36 hours, and there was moderate bilateral scrotal edema for three days; otherwise conva-

lescence was relatively uneventful. Following convalescent leave the patient was discharged on 29 April, his 22d postoperative day. Six months later he had a viable, grossly normal testicle, save for an absent epididymis. Histologically, the lesion was a nonspecific infectious process.

Although precipitated by excessive straining, this case is an example of epididymitis secondary to lower tract infection.

SUMMARY AND CONCLUSIONS

In a series of 189 cases of epididymitis, 164 were acute and 25 chronic. An admission diagnosis of epididymitis, epididymo-orchitis, or orchitis was made in 209 cases, but only 176 of these proved to be epididymitis. Six patients developed the condition while hospitalized for other reasons, and seven who had been admitted with other diagnoses proved to have epididymitis.

The cases fell into five clinically distinct categories: (1) idiopathic epididymitis (90 cases), which might conceivably be caused by retrograde flow of urine (although no clinical evidence has been presented to either confirm or deny this); (2) cases preceded by an acute upper respiratory tract infection with pneumonitis frequently demonstrable (60 cases); (3) epididymitis associated with, or possibly secondary to, lower urinary tract infection (27 cases); (4) chronic granulomas (6 cases); and (5) trauma alone (6 cases).

Although the incidence of congestive prostatitis in random samplings of over 1,000 healthy young men in the military service was greater than 20 per cent,[8] it was found in less than 20 per cent of the 136 cases of acute benign epididymitis, and is believed to have no significant relationship to acute epididymitis.

In lower urinary tract infections, the epididymitis rate was 1 in 154. Considering urethritis alone, the epididymitis rate was 1 in 566.7 cases of nongonococcal urethritis, and 1 in 625 cases of gonorrhea. The frequently encountered supposition that a man with epididymitis has a urethritis until proved otherwise is unwarranted. In fact, patients with acute cystitis had a far higher incidence of epididymitis (1 in 8.7).

In 278 patients with severe posterior urethritis, all but one had prostatitis. Ascending spread of the infection occurred in 62, while only 20 developed epididymitis---less than one out of three. This suggests that the prostate is not an avenue of dissemination, but a barrier protecting the epididymis from retrograde spread of infection.

None of the 189 cases of epididymitis was complicated by orchitis. This was confirmed in 26 patients during surgical procedures. The terms epididymo-orchitis and orchitis (other than in

reference to specific orchitis, like that of mumps) obviously should be used sparingly.

A regimen of absolute bed rest proved adequate in the treatment of the benign acute lesions.

Granulomas were associated with 24 per cent of the chronic lesions.

Although lower urinary tract infections caused only 27 (14.3 per cent) of the cases of epididymitis in this series, these cases proved to be especially recalcitrant. Almost a third of them required surgical intervention, and four others developed a chronic fibrosis. The average hospital stay of one month for those patients in this group not requiring an operation was five times as long as the average stay for those with "idiopathic" epididymitis and almost three times as long as for those with epididymitis associated with an acute respiratory tract infection.

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TUMOR PATHOLOGY SLIDES AVAILABLE

Lantern slide sets on Tumor Pathology are available on a loan basis from the Armed Forces Institute of Pathology. These are black and white (3¼ by 4 inches) and color (2 by 2 inches) reproductions of the illustrations published in the various fascicles of the *Atlas of Tumor Pathology.* A listing of the available sets as well as a loan request form may be obtained from The Director, Armed Forces Institute of Pathology, Washington 25, D. C.

THE NATURE OF BENIGN PROTEINURIA

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BENIGN proteinuria may be defined as the passage of serum protein into the urine in the absence of urinary, genital, and vascular disease. It is a harmless disorder, which spontaneously disappears in the course of a few years,[1] and has been reported to occur in from 2 to 16 per cent of healthy males between the ages of 16 and 25.[1-4] It can be readily understood that the differentiation of benign proteinuria from proteinuria reflecting underlying disease is an important consideration at this receiving station through which, on an average, 3,000 enlisted men per month have passed during the last year. If, on separation physical examination, any man is found to have a defect which would disqualify him for continuation on active duty or if any man presents evidence of a condition which might have serious import, that man must be transferred to a U. S. naval hospital for treatment and disposition.[5,6]

Fortunately, there are two characteristics of beign proteinuria which are excellent for screening purposes: (1) Proteinuria is intermittent. (2) Casts and blood cells are not found in the urine. Wolman[3] showed that the amount of protein passed cannot be used as an index of differentiation between functional and organic proteinuria.

Because enforced, exaggerated lumbar lordosis, particularly in the upright posture, almost regularly causes protein to appear in the urine of men with benign proteinuria, possibly by producing pressure on the left renal vein as it lies in the fork between the superior mesenteric artery in the root of the mesentery and the aorta, most physicians are inclined to accept the orthostatic theory. Our experience indicates that the importance of the lordotic, orthostatic position in regulating the appearance of proteinuria in these cases is negligible under ordinary circumstances.

METHOD

In this clinic, random urine specimens are collected and tested for protein with sulfosalicylic acid reagent. Positive results are recorded from trace (between 10 and 30 mg per 100 ml) to 4 plus

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(over 100 mg per 100 ml). All men with a positive result return the next day for another test. If the second specimen is positive, a third specimen is examined the following day. Microscopic examinations are done on the second and third specimens. Because some of the men are extremely anxious to pass their examination, urine for repeat examinations is voided under the direct supervision of a laboratory technician to eliminate the possibility of substitution.

Any man who has protein in his urine at least once but not more than twice and who has no other abnormal laboratory or physical finding passes his examination and is considered to have benign proteinuria. Any man who has proteinuria on three consecutive days and who has no other abnormal laboratory or physical finding is placed on the sick list.

Since 1 June 1955, the following procedure has been employed with the latter group. They receive a regular diet and are permitted out of bed. Urine is collected on arising and at three other times during the day for three days. If overnight urine samples are consistently negative for protein, the man is discharged with a diagnosis of orthostatic albuminuria even though some of his diurnal specimens do not contain protein. If the majority of urine samples are negative but have no special pattern, the man is considered to have benign proteinuria of a nonorthosatic variety. All patients have fallen into one of the two above categories.

DISCUSSION

During the past six months 10 per cent of the men examined at this station incident to separation from active duty have had at least one urine positive for protein. Analysis of our records during the period from 1 February 1955 to 15 July 1955 indicated that 188 men (1 per cent) out of 18,627 men examined had urine positive for protein on three consecutive days. Of the 69 men hospitalized for repeated proteinuria from 1 June 1955 to 15 July 1955, only five (7 per cent) fell into the orthostatic classification as described above.

There were two perplexing questions:

1. Why did 90 per cent of men with benign proteinuria fail to have urine positive for protein on three consecutive days?

2. Why did 93 per cent of the men hospitalized for having three consecutive positive urines yield almost consistently negative specimens in the hospital?

Beginning on 16 July 1955, men in whose urine protein had been found received a short talk on the day of the first test from the medical officer or the corpsman in which they were advised

to obtain sufficient rest, to refrain from strenuous activity, to eat an adequate diet, and to drink no alcoholic beverages. The desire to be separated on time provided motivation that almost ensured close adherence to our suggestions. During the next four weeks, although the usual 10 per cent incidence of benign proteinuria occurred, not one man had three positive specimens. Consequently, no admissions were required. Table 1 compares the four-week period immediately preceding the institution of these advisory talks with the four-week period that followed. I believe that moderation in the activities of these men while on liberty is responsible for the remarkable change in our laboratory results.

TABLE 1.

Four-week period	Number of men examined	Number with benign proteinuria	Number admitted to hospital
18 June-15 July	2,393	217	37
16 July-12 August	1,962	190	None

CONCLUSIONS

The cause of benign proteinuria remains unknown. Apparently the defect appears intermittently in response to certain external influences. Although Murphy[3] demonstrated proteinuria in 85 per cent of the patients he studied after enforcing lumbar lordosis for 30 minutes, this factor is not operative in everyday life. On the other hand, what may be called subclinical fatigue seems to be a predisposing factor that is frequently present.

SUMMARY

During the last six months, the incidence of benign proteinuria in men being separated from active service at this station was found to be 10 per cent.

A modification to expedite the screening of men for benign proteinuria was described.

In less than 1 per cent of the cases, lordosis and orthostasis were determining factors in the appearance of the disorder clinically. The beneficial effect of moderation in activity was demonstrated.

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THE STIMULATION OF INTEREST

Perhaps the most important single function of the teacher of any subject is to inspire his pupils with the desire to learn. It is not sufficient merely to provide facilities and information; the subject must be so presented that the student is actively encouraged to find out what he can about it. One of the faults which twentieth-century medical education shares with most other modern educative training is that it may easily degenerate into a stereotyped and soulless uniformity. The student goes through the motions of attending a set number of lectures, performing a set number of unimaginative experiments, and producing a few predigested opinions at a dull examination, as a result of which he finds himself qualified as a doctor without ever having had to display even a minimal quantity of originality, resource, or enthusiasm. To allow this to happen is to deny the whole principle of higher education. This is not what a university is for. Yet unless we are constantly thinking over how the form of our teaching could be made more stimulating and thus more valuable, it is fatally easy to slip into the comfortable bonds of routine, and to be satisfied that if the student complies with the statutory regulations of the medical degree we have done our best by him.

—D. C. SINCLAIR, M. D.
in *Medical Students and Medical Sciences*, Oxford University Press
1955, p. 49

THE TECHNIC OF FABRICATING VINYL RESIN MODELS

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VISUAL aids in the teaching of clinical recognition of periodontal diseases have been limited in the past to the realm of flat plane projections in black and white or color with accompanying written description. Models for study or for record purposes have been limited to plaster products or to lifeless-looking acrylic resins, all of which leave much to be desired. As a result of much research and experimentation in the field of vinyl resins over the past 10 years at this school,[1-3] a simple yet practical method of producing soft, resilent, lifelike models of periodontal disease entities has been developed. The value of such models as study aids, for patient education, for clinical presentations, for case histories, visual aids for teaching, et cetera, is easily recognized.

The procedure in the production of these lifelike models is basically that described by Peck and associates.[3] It involves (1) taking an accurate impression of the complete arch with alginate impression material, (2) pouring a cast in high-heat investment (C-51 Ticonium) on the impression, (3) covering the cast with baseplate wax and spruing, (4) embedding the wax-covered, sprued cast in high-heat investment, (5) boiling out the wax and drying the mold, (6) pouring a final mold of Linotype metal, (7) painting the resilient vinyl resin into the metal mold, (8) processing the resultant model and, finally, (9) modifying the model and applying the final cure.

ALGINATE IMPRESSION

The alginate impression material is mixed according to the manufacturer's directions and placed in a previously selected and fitted impression tray. The technic which best suits the operator in making an accurate, complete, alginate impression of the arch in question is used. The impression is removed when final setting is complete (fig. 1). It is cleared of saliva and mucin by washing it with a mix of plaster water. Excess moisture is then removed with an air blast, and the cast is poured. Before dismis-

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sing the patient, the operator should take Kodachrome transparencies, which will be necessary later in the procedure.

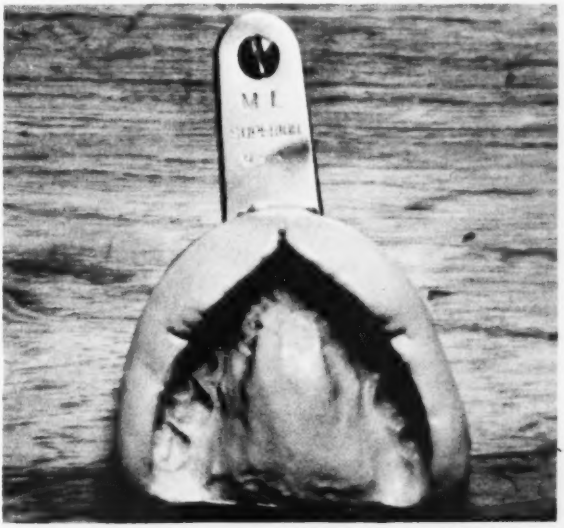

Figure 1. Alginate maxillary impression.

INVESTMENT MODEL

The cast is covered with high-heat investment (C-51 Ticonium), which is mixed according to the manufacturer's directions and carefully agitated into the impression. The impression should be trimmed to the exact size and shape desired for the finished vinyl resin replica (fig. 2).

THE WAX COATING

The cast is then uniformly covered, except for its base, with two layers of pink baseplate wax. The wax is luted to the model at the bottom edge, leaving the base of the cast free from wax. Excess wax is added wherever necessary to ensure a uniform thickness of wax equal to two layers of the baseplate wax (fig. 3).

A sprue is made from a piece of baseplate wax by gently warming the sheet, folding it over lengthwise, luting the two long edges together, and slightly flattening the resultant tube. This sprue is luted to the wax-covered model on the distal edge (fig. 4).

The wax-coated and sprued high-heat investment cast is undercut on its wax-free base for retention in the mold which is formed by completely embedding it in high-heat investment with the distal end of the wax sprue protruding (fig. 5). About one-inch thickness of the investment material should cover the waxed cast in all dimensions. This is allowed to set completely.

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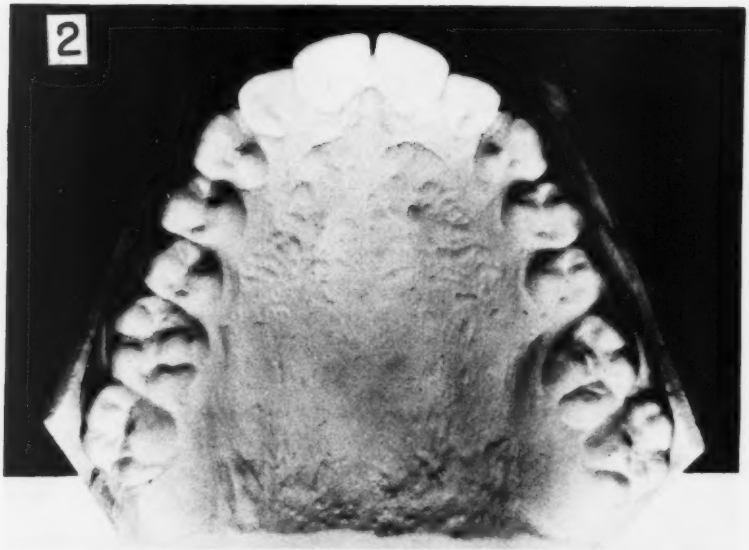

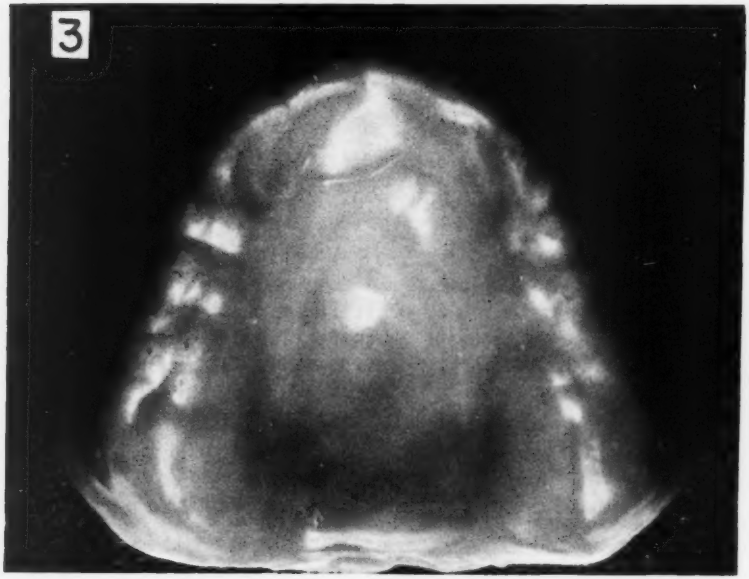

Figure 2. High-heat investment cast. Figure 3. Occlusal view of waxed cast.

The entire mold is then placed in boiling water and permitted to remain until all of the wax is eliminated. The mold should

then be removed and placed in a 180° C dry-heat oven for a minimum of eight hours, and preferably over night, to ensure complete dehydration of the investment material.

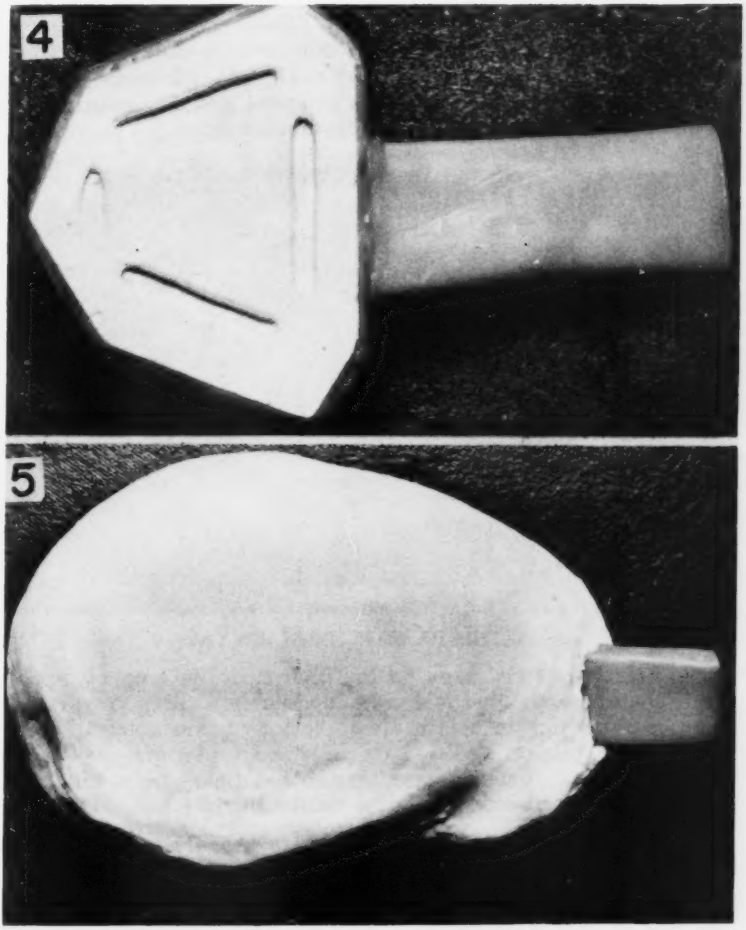

Figure 4. View of undercut base of the waxed cast. Figure 5. High-heat investment mold.

THE LINOTYPE METAL MOLD

The metal mold is made from Linotype metal which melts at 260° C. This metal is heated in a large crucible over a Bunsen flame and poured in one operation into the hot investment mold. The metal is allowed to cool in the air for 10 minutes, during which time it solidifies. Then the entire mass is immersed in

cold water. All of the investment will not completely disintegrate within the metal mold. Care must be exercised in digging the remaining investment from the mold, otherwise surface scoring of the metal negative will be positively reproduced in the finished model, producing undesirable results. The metal mold is cleaned by painting in a thin layer of elastomer with a stiff bristled artist's brush. The mold is placed in a 180° C dry-heat oven for 10 minutes. The elastomer is then removed and the mold dried. The mold is now ready to receive the vinyl resin (fig. 6).

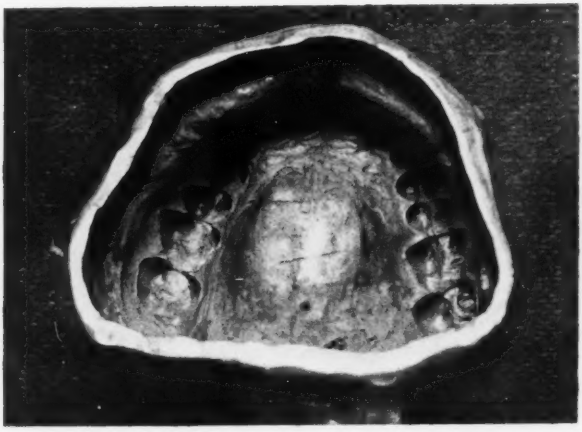

Figure 6. Mold ready to receive the vinyl resin.

THE PLASTIC REPLICA

The plastic material used for the final model is a copolymer of vinyl acetate and vinyl chloride, commonly called vinyl resin (Flexi-derm) which is obtainable in various basic colors. These basic colors can be modified by vinyl resin pigments available for this purpose. These resins resemble ordinary paint but have a consistency somewhat similar to that of liquid latex.

The purpose of this step is to prepare a basic colored model employing shades resembling normal enamel, cementum, and gingiva. Enamel shade Flexi-derm is prepared by first adding zinc oxide to neutral base to make pure white, and then adding yellow pigment until the desired shade is obtained. The tooth areas of the metal mold are covered with a thin layer of this tooth shade. This is best accomplished by carrying it to place on a small sharp instrument such as a Hollenbeck No. 3. It is flash-cured by heating the metal mold over a Bunsen flame until the luster fades. Subsequent layers of tooth shade are added and flash-cured until the tooth area is completely filled. If there is any area of cementum exposed, a suitable shade is prepared by

adding more yellow pigment to the tooth shade. This is then applied in the cementum area of the mold, and it is flash-cured as before. The remaining portion of the model is created by adding Flexi-derm in bulk, brushing it in with a wide, stiff, artist's brush (bristle one half to one inch). First one coat of Flexi-derm undertone No. 4 is applied and flash-cured. The second layer used is Flexi-derm skin base No. 11 which is similarly brushed in and flash-cured. This is followed by subsequent layers of Flexi-derm undertone No. 4, each of which is flash-cured as before until a thickness of about two millimeters is obtained.

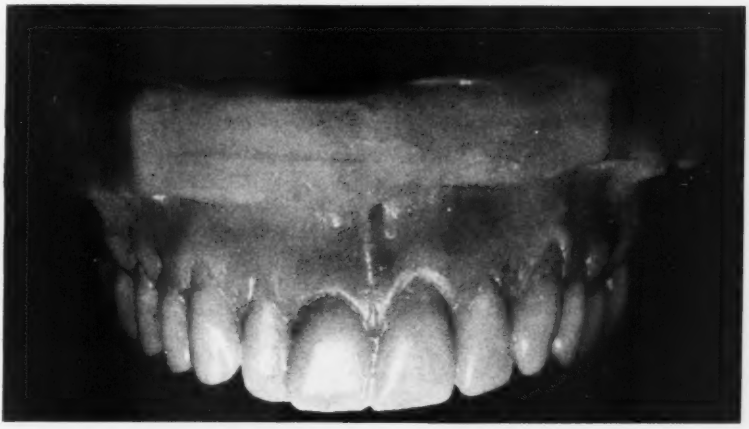

Figure 7. The finished vinyl resin reproduction.

The metal mold is now placed in a dry heat oven at 180° C and allowed to remain for 10 minutes. At the end of this period, the mold is plunged into cold water and the vinyl resin model is removed by stripping it from the sides of the mold.

At this time other pigments may be added to make the model lifelike and to simulate the pathologic conditions and abnormalities depicted in the color transparencies that were taken at the time of the initial impression. These pigments are added either by applying a small amount with a sharp instrument or by painting with a fine camel's hair brush, as the conditions to be simulated may require. These might include restorations, caries, calculus, materia alba, inflammation, et cetera. As each stain is applied it is flash-cured by lightly brushing the surface of the model with a Hanau torch; care must be taken not to scorch the model. When the desired result has been obtained, the model is placed on a gauze napkin in the dry-heat oven for two minutes and then promptly removed. Lifelike luster is imparted by quickly and lightly brushing it with a mixture of one part clear acrylic polymer dissolved

in 10 parts of monomer. This air-dries in about 10 minutes, and the model is completed (fig. 7).

CONCLUSIONS AND SUMMARY

We think that the method of preparing a basic normal colored model and modifying it by adding individual features, as described above, is easier and places the technic within the realm of practicability for every practitioner of dentistry. With the exception of the vinyl resins, the materials required are already at hand. The dry-heat cure can easily be performed in almost any oven, even a kitchen range. The vinyl resins are readily obtainable at a nominal cost. The procedure is useful in fabricating vinyl resin models for almost any purpose imaginable. There are many advantages over plaster and acrylic models. These reproductions are resilient, and lifelike conditions can be readily duplicated, using color transparencies as a guide.

The procedure does require a little time, but once the metal molds have been fabricated, innumerable models can be produced.

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FACTS ON MEDICAL STUDENTS—1956

a. Eighty-one approved medical schools in United States, of which 75 conduct full four-year programs and six conduct two-year basic medical science programs.

b. Enrollment 1954-55 totaled 28,583
(1st year—7,576; 2nd year—7,104;
3rd year—6,957; 4th year—6,946)

c. Graduates in 1955 were 6,977.

—COUNCIL ON MEDICAL EDUCATION
AND HOSPITALS

SEVERE ALCOHOLISM IN CAREER MILITARY PERSONNEL

JACK V. WALLINGA, *Lieutenant Commander (MC) USNR*

ALCOHOLISM has long been a problem of society. The persistent and excessive use of alcohol presents an additional difficulty in military settings where the breakdown of functioning in one person is likely to involve the performance and effectiveness of a much larger group. In this study is defined the scope of the problem of severe alcoholism as viewed from a psychiatric hospital setting. Impressions that alcoholism is more a problem of the older serviceman in the latter part of his military career are common. Reported also are clinical observations of underlying personality factors which seem to be related to an excessive use of alcohol and a dependence on it. In many cases these elements of the personality structure are also important factors in the individual making a strong positive identification with the military organization to the extent of seeking a career in the service.

Various categories of chronic alcoholism have been described in detail in the literature.[1] The largest group seen in military service is composed of the "secondary addicts," whose drinking is primarily exogenous. They are habituated to alcohol or have become chronically alcoholic through the process of becoming accustomed to a practice rather than from becoming addicted during their first experiences with alcohol. Many years of heavy "social drinking" result in the secondary addict developing a need for alcohol. Mental and physical changes, personality changes, and delirium tremens are commonly observed in the secondary addict. Many had previously excelled in their work and had real accomplishments behind them. Their early psychologic adjustment to life was apparently good. In this respect they differ from the "primary addict" whose drinking habits arise mostly from within the personality structure and are little influenced by external factors. The primary addict craves the effect of alcohol and is addicted from his first use of it. He is not commonly seen among military personnel. The third group includes occasional individuals who would be classed as symptomatic drinkers. Their alcoholism is endogenously determined, but drinking does not

From U. S. Naval Hospital, Oakland, Calif.

solve their personality problems and eventually the underlying disturbance breaks through, usually in the form of some overt clinical entity such as schizophrenia or manic-depressive illness.

Knight[2] suggested that the individual is conditioned by trauma in infancy to expect relief from discomfort by taking something into his mouth—the discomfort arising out of excessive passive needs which stem from the parents' attitudes. These needs lead usually to chronic disappointment, frustration, and anger. In this setting of inability to adjust to the stresses of the environment, the person discovers that alcohol transiently relieves the psychic tension resulting from the inferiority feelings which arise from passive oral needs, and the infantile state of euphoria is regained. In many circumstances the drinking is regarded as socially acceptable and even praiseworthy while serving as a means of gaining direct oral gratification. The defense mechanisms of the ego against anxiety are temporarily strengthened by drinking and intoxication. By its depressing effect, alcohol may also reduce the awareness of anxiety, or the intoxication may allow the expression and operation of other defense mechanisms previously inhibited.

Efforts to describe the "typical" alcoholic personality have been unsuccessful. There is no satisfactory evidence that persons of one type are more likely to become alcoholic than others. However, some characteristics found in many people seem to be prominent in the alcoholic.[3] An incapacity to tolerate strain and tension is often seen. The alcoholic cannot persevere and overcome disappointments and difficulties. When he reaches adolescence he cannot meet the responsibilities of adult life because he lacks inner directivity. He suffers from anxiety and guilt feelings, in contrast to the psychopath with whom he has often been compared.[4] The alcoholic is self-centered. He lacks emotional warmth, makes poor adjustments in his social and interpersonal relations, and is generally a constricted and stereotyped person. These characteristics suggest a regression to a lower level of personality development as an escape from difficulties. A strong attachment to the mother has been reported in many alcoholics, as have oral sadistic tendencies, sexual frustration or impotence, repressed homosexuality, and self-destructive tendencies.

STATISTICAL DATA

This study is based on observations of 94 career Navy and Marine Corps personnel from the psychiatric service of this hospital. All patients admitted from duty during a 10-month period, who had at least 8 years' active duty and who were considered severely alcoholic (group 1), were included (table 1). Severe alcoholism in this group was defined as persistent and excessive drinking

TABLE 1. *Number of alcoholic and nonalcoholic patients admitted to the psychiatric service by years of service*

Group	Years of service at time of admission																				Total number of cases
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Group 1 Severe alcoholic	3	7	8	3	9	15	6	8	7	6	3	2	6	1	3			2		5	94
Group 2 Nonalcoholic	8	10	16	2	7	7	7	2	4	4	2	4	1			1	1	1	1	1	79
																					173

which seriously interfered with social and/or service adjustment. Only patients with 8 or more years of active duty were included, on the assumption that this length of service indicated military career intentions. During the period studied—1 May 1954 to 1 March 1955—there was a total of 804 psychiatric admissions, of which 173 had more than 8 years' active duty. Those patients admitted with over 8 years' service who apparently did not have the complication of alcoholism (group 2) are included in table 1 for comparison. In their history they indicated only moderate drinking or denied the use of alcohol completely. Undoubtedly this group includes some "symptomatic drinkers" who had used alcohol previously as an adjustment mechanism without complete success. The emotional disturbance with which they came to the hospital on this admission represented subsequent attempts to deal with reality and their conflicts. Diagnostically, on discharge from the hospital, group 2 was comprised of 35 per cent psychotic, 46 per cent neurotic, and 19 per cent personality disorder cases. Valid diagnostic differentiation was difficult because of marked variability and changeability in the use of diagnostic labels.[5] Group 1, in comparison, at the time of discharge from the hospital, consisted of 23 per cent psychotic, 51 per cent neurotic, and 26 per cent personality disorder cases. Of the individuals in group 1, four were initially admitted to the sick list with a diagnostic impression of alcoholism and eight others had an established diagnosis of alcoholism, but these diagnoses were all changed and none were discharged with the diagnosis of alcoholism.

As seen in table 1, the excessive use of alcohol, indicated by the subsequent development of severe alcoholism, appears to have been a moderately effective ego defense. Cases in group 1 with 15 to 20 years' service on admission represented 65.3 per cent of the total admissions in both groups with this length of service. On the other hand, individuals with psychiatric problems other than alcoholism (group 2) comprised 65.4 per cent of those admissions studied, with only 8 to 10 years' service.* The length of service completed on admission to the hospital averaged 14.9 years for the alcoholic group and 13.0 years for the moderate and nonalcoholic group.**

There were 12 commissioned officers in each group. Evidently the selection of officers does not eliminate individuals predisposed to alcoholism, nor are the demands on officers reflected differently than the demands on the petty officer group. It was found that officers with a severe alcoholic pattern averaged 19.6 years' service when admitted as compared with 16.7 years for the officers in group 2.

*Critical ratio (C.R.) = 3.07, significant at the 1 per cent level.
**C.R. = 26.9, significant > 1 per cent.

ALCOHOLISM AND DEPENDENCY NEEDS

Alcoholism was not generally a serious problem with the group observed during the eight years of service preceding their inclusion in this study. Clinically, many of them gave a history of drinking being a problem for only a few months to a few years before their admission to this hospital. In several, duty in combat areas during the Korean conflict precipitated the anxiety which drinking was used to relieve.

Observation of these patients during hospitalization, particularly in individual and group therapeutic sessions, revealed certain basic emotional needs in relation to the military framework. Traditionally a service career provides an opportunity for a young man, usually a late adolescent with all the uncertainties of that age group, to join and identify himself with a strong, secure, uniformed organization. Within this group setting, the individual may find a satisfying dependent relationship with a minimum of individual decisions required of him. He is taken care of with respect to his basic needs; he is fed and clothed, receives medical care, and arbitrarily receives changes of duty so that he need not be faced with deciding when and where to move or with maintaining close interpersonal relationships. He is rewarded with promotion for obeying orders and for closely following instructions given by superiors who are often regarded as paternal substitutes and who can be relied on to make correct decisions. In the men studied, adjustment was easier and better in the early years of their service, when the demands made of them were minimal and they had only to fulfill the role of the newly enlisted man. As their long-term goal of completion of 20 years' service (and with it, retirement) approached, the future which previously had appeared bright became realistic and threatening. The small business or farm that the man imagined himself owning after retirement lost its attraction and became a threat of increased demands, insecurity, and responsibility. Retirement represented a challenge and a fulfillment, but also threatened to destroy the gratifying dependent relationship with the military organization. There seemed to be a magical quality about retirement, as though their leaving the job incomplete *now*—by discharge short of 20 years—would make it somehow possible for them to re-enter *later* and complete their service; thus imparting a feeling of being needed and hence, a sense of security.

Another factor in the development of alcoholism in these men in the later part of their service career that reflects their inability to tolerate the pressure of increasing responsibility is the necessity for making their own far-reaching decisions as they are advanced in rate, rather than being able to depend on others as they could in their earlier service years. They now find others

depending on them, and although there is always a structure of senior officers, their dependent position is no longer as complete and satisfying as formerly. Promotion, rather than allowing these men to continue in their satisfactory dependent role, places them in the situation of having younger men look to them for support and "fathering." The complaint was frequently heard that "the Navy isn't what it used to be." With some men, increasing demands were reflected in complaints that the requirements of their rate had been changed; for instance, bakers being required to take on general cooking duties also. It was common to find patients who had been demoted in rate not once, but several times, with the demotion often immediately preceding or coincident with their being sent to the hospital. They then seemed relatively unconcerned about losing their status and were usually not motivated to return to duty and regain their lost rate. Although they verbalized a strong desire to complete their service, ambivalence about accomplishing this goal was revealed in the drinking and other unacceptable, acting-out behavior, even during hospitalization, which left no alternative but to separate them from the service. Some of this behavior appeared to be motivated by a desire, perhaps unconscious, to be removed from their position of responsibility and independence.

ALCOHOLISM AND MARITAL ADJUSTMENT

The strong dependency needs of these individuals also seemed to be reflected in their choice of a marital partner and in their marital adjustment. Many marriages were entered into later in life with the men marrying women, several years older than themselves, who were typical mother figures.

Case 1. A 32-year-old First Class Petty Officer was married two years before hospitalization. It was his first marriage and his wife's third; she was eight years his senior and had a daughter 26 years old. This marriage was apparently entered into by the patient to help deny latent fears of homosexuality. Excessive drinking had precipitated two previous emotional upsets, both of which led to psychotic illnesses with threatened suicide.

Case 2. A 31-year-old First Class Petty Officer first married a woman seven years his senior; his second wife was 14 years older than he. His severe drinking began two years previous to hospitalization and in this two-year period he had five instances of misconduct leading to disciplinary action. One month before admission to the hospital he was demoted from Chief.

Case 3. A 41-year-old Chief Petty Officer had been drinking excessively and uncontrollably for the month previous to hospitalization. He was afraid to go home from the hospital to his overbearing, critical,

demanding wife, so he got a hotel room for himself and there drank continually, eventually requiring readmission to the hospital.

Case 4. A 47-year-old Chief Warrant Officer of the Marine Corps with 27 years' service first married at the age of 30. His comment regarding marriage was, "I never did want the responsibility, I guess." The patient's wife left him a year and a half before hospitalization. He then felt unwanted and inadequate in his job, and began making inappropriate remarks to high ranking officers. Recently he had expressed occasional suicidal thoughts.

Case 5. A 31-year-old Third Class Petty Officer with 14 years' service had been demoted from First Class just prior to hospitalization. His wife, 11 years his senior, was very mothering, supportive, and helpful to him. The patient wanted to die and was passively suicidal without demonstrating active hostile or destructive tendencies.

It was observed that marriages in this group frequently seemed to function better "at a distance," that is, either the patient or his wife reported that they both got along well while the man was at sea, but soon after his return home marital discord and incompatibility began. Some men found a wife desirable when she was some distance away physically; then the man could fantasy about his relationship with her, talk about her to his shipmates, and in this way maintain a dependent relationship with her without actually having to assume a dominant role as the man of the household or to meet the responsibilities of being a husband and a father.

The wife of a Captain with 27 years' service stated with indignation when she left him for the last and final time: "He wants me to be a mother to him."

Another patient did well within the structured hospital setting, but when he went home on weekends with his wife, consistently began drinking within a few hours, and the remainder of the weekend would be spent in his drinking and both of them quarreling. Soon after his return to the hospital on Monday morning he would settle down again and do well for the rest of the week, eagerly requesting weekend liberty and looking forward to joining his wife for whom he expressed lonesomeness. This couple had three children who were temporarily living some distance away with relatives. During hospitalization the youngest child was returned to the area to stay with them, and it was noted that the patient's drinking became heavier at this time when his responsibilities as a father were more apparent. He stated that although he realized that he simply could not get along with his wife and that most of their difficulty arose from his ambivalence as to who would assume the dominant role in the family, he absolutely

could not think of being without her. He complained bitterly that everybody, including his wife, treated him like a baby, but when given any individual responsibility he behaved very irresponsibly.

ROLE OF ORAL GRATIFICATION

Strong needs for oral gratification were observed in several patients. When drinking was prohibited by the use of Antabuse (brand of disulfiram) or ward restriction, excessive drinking was frequently replaced by a desire to eat, with the result that weight gains of considerable proportion were observed and remarked upon by the patients. The satisfaction they derived from eating was surprising to them. It was noted that the oral gratification seemed to be predominantly oral-receptive rather than oral-expressive. In both individual and group settings, these patients tended to be passive and nonverbal. Several who participated in the Alcoholics Anonymous (AA) program expressed discomfort at the amount of verbal expression at the AA meetings and felt that they were not able to enter satisfactorily into the AA group feeling.

Alcoholics Anonymous, which has proved effective in helping alcoholics in many situations, was not found to be a satisfactory long-term solution for these men, although they were encouraged to contact AA while in the hospital. The effectiveness of the AA program is largely through the strong supportive value of the AA group. With relatively frequent changes in duty assignment, the serviceman is unable to make best use of AA because he cannot continue a permanent, meaningful relationship with a single AA group. This was particularly true here since the first group contact that the patient made was at the hospital or in conjunction with his hospitalization, and when he returned to duty the group support was interrupted at a critical time. The alcoholic, when sober, generally does not make new friends easily. Most of the men needed strong encouragement from the staff to seek out and join the AA group on the first occasion, and they would likely find it difficult to join a new AA group spontaneously when they were moved to a strange community.

RELATIONSHIP TO PARENTS

A strong tie to their parents was another aspect of the strong dependency needs of many of these men. This was commonly seen as a conflicted, ambivalent relationship, particularly in the patients who had never married.

Case 6. A 31-year-old Chief Boatswain Mate was returned to the hospital admitting room thoroughly intoxicated 10 days after he had been discharged from the hospital to duty. On the night of readmission, he had gone to the airport, from which he intended to fly across the

country to spend the remainder of his leave with his parents. Although he felt deeply obligated to visit them, since he had not seen them for three years, the closer he got to the airport the more frequently he and his companion had to stop for drinks, until when he finally arrived he was so intoxicated he was unable to board the plane, and his companion brought him back to the hospital. On arrival here the patient dramatically exaggerated the severity of his condition to impress the physicians with his need for rehospitalization. He complained loudly of pains in his stomach, rolled off the bed, and collapsed on the floor, tearing his clothing until it was decided that he would be admitted. Thereupon his symptoms immediately subsided and he became very pleasant and co-operative, although still quite intoxicated.

ALCOHOLISM AS SELF-DESTRUCTION

Chronic alcoholism has also been described as a form of slow self-destruction;[6] physical deterioration and eventual death result from continued excessive drinking. In this group alcohol was also seen to be self-destructive by endangering service career goals. Despite repeated hospitalizations to help them control their drinking, many of these men who pleaded for return to duty to finish 20 years were unable to stay out of a hospital for even a moderate length of time because of alcoholism. More striking was the incidence of suicidal attempts or threats, reported in 16 of the 94 patients. One man successfully accomplished suicide while in the hospital. In addition, four patients received a diagnosis of psychotic depressive reaction and nine more were labeled with neurotic depressive reaction, although specific mention of suicidal thoughts or attempts was not noted in their records.

DISCUSSION

In the group of men studied, it is observed that effective functioning in the latter part of their service career is interfered with by their inability to control their drinking. Often it becomes necessary to separate from the service highly trained individuals with long experience at a time when they would have much to offer in the training and supervision of younger men. What measures might enable these men to continue to serve effectively and reliably on active duty to the benefit of the service? The observations of this study suggest that the structure of the service tends to promote some men out of the level in which they can comfortably and effectively function. Perhaps a more realistic course would be one adapted to the strong dependency needs of such individuals. Promotion might be restricted to prevent them from rising above the zone of their effective performance, or in order that they would not so acutely feel group pres-

sure to seek advancement they could be recognized in another manner. Their apparent acceptance of a lower rate is reflected in the complacent attitude observed in those men recently demoted, and their lack of interest in promotion. It may well be that many such individuals have some awareness of their dependency needs and prefer to remain in a lower rate, but feel uncomfortable when standing out from the group in this fashion.

Another approach would be the restriction of billets to accommodate the personality limitations of the man while continuing to meet the demands of the service. The extensive training and experience of these men is a valuable asset and could be used in billets where individual performance rather than individual responsibility and decision are required. Even closely structured group situations where strong senior leadership is readily available would enable many of these men to continue to serve satisfactorily. Sea billets in particular are well adapted to meet their needs. Alcohol is less readily available at sea, and the group structure on board ship is usually closer and provides a better dependency situation for the man; furthermore, he is away from the demanding, stressful home situation. Some of those studied suggested that if they could have sea duty for the remainder of their service they would be able to finish 20 years without difficulty. Such modifications of assignments would be in keeping with a philosophy of the maximum use of marginal manpower.

SUMMARY

A significant incidence of alcoholism is found in 94 of a group of 173 career service personnel studied. Personality features of strong, unresolved maternal dependency needs, difficulty in forming close interpersonal relationships, avoidance of individual responsibility and decision, intense oral needs satisfied by the ingestion of alcohol or food, and both conscious and unconscious self-destructive feelings have been previously reported in alcoholic individuals and were observed in the individuals in this study. These emotional needs also appear to be related to these individuals finding sufficient satisfaction in the military service to make a career of it. Modifications of the traditional military structure are discussed which would enable such persons to function more comfortably and satisfactorily, as it was found that in the latter part of their period of service the personality factors which led to alcoholism, and the alcoholism itself, tended to become disabling.

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RESEARCH, MODERN STYLE

"The achievements of science in some fields have caught the popular imagination of the public to a degree that has never occurred before. The press, radio and television continually remind its readers, listeners or viewers that given enough money the 'scientists' can solve any problem and if given twice as much money can do it in half the time. We have seen this doctrine promulgated to the point where the ordinary citizen can hardly buy the simplest necessities of life without the oft repeated assurance that its taste, palatability and nutritive qualities have been assured by the research efforts of a devoted, unbiased and highly skilled corps of scientists. Of even graver import is the persuasion of the public that the donation of large sums of money is all that is needed to eradicate or cure the more serious diseases of mankind. I am disturbed by the implied promises in these annual campaigns for several reasons; first, because the present lines of research may not succeed in living up to such promises, leaving the public, upon whom the responsibility for the support of future research must depend, with such a sense of disappointment, if not worse, that the slow but steady accretion of basic knowledge will be retarded; second, because this is not the right form of public education as to how research is done, and by whom it is done; third, because it relegates to a secondary place the vastly more important task of finding and training new investigators, not as junior members in a team seeking to find a cure for a particular disease, but as independent and creative investigators in their own right; fourth, because research in a few areas is overemphasized and overfinanced, leaving other areas, the future importance of which no one can estimate, understaffed and lacking the often modest requirements for work, and lastly, because support being on a yearly basis does not allow the unhurried contemplative study of the problem that is essential, nor does it give the degree of security that such efforts require."

—C. N. H. LONG, M. D.
in *Pediatrics*
p. 204, Feb. 1955

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PROCTOSCOPY AT AN ARMY HOSPITAL

Methods and Analysis in 1,000 Consecutive Medical Patients

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WILLIAM M. WEBB, *M. D.*

THE value of proctosigmoidoscopic examination has long been established;[1-6] therefore, nearly every patient on the gastroenterology service of this hospital receives this type of examination as part of his evaluation. This report presents a review of proctosigmoidoscopic examinations performed at this hospital on 1,000 consecutive patients from 1 January 1951 to 1 August 1954, and an analysis of the types of lesions found.

It was anticipated that the findings in a great percentage of examinations would be normal because our patients were predominantly in the military age group (18-35 years). It is our opinion, however, that the defects found warrant its routine use. Familiarity with the technic of passing the sigmoidoscope and with the appearance of the normal bowel is of great value, especially in the training of younger physicians. Visualization is merely a part of the diagnostic value of the sigmoidoscope because there is a definite tactile sense, which is developed with experience, enabling one to detect such things as fibrosis and extrinsic pressure defects.

MATERIALS AND METHODS

The most satisfactory preparation of patients, in our experience, is cleansing of the colon with tap-water enemas about two hours preceding the examination. When dealing with patients complaining of diarrhea, however, we prefer to examine the patient without preparation. If visualization is unsatisfactory, the patient is then given a small tap-water enema and re-examined.

In clinical practice we use a breakdown table for positioning of the patient. This is, of course, not essential, as a great number of examinations are performed in the Sims and knee-chest positions.

Equipment consists of proximal and distal lighting proctosigmoidoscopes. Suction is a necessity for proper visualization. It is important to instruct the patient adequately before subjecting

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him to the procedure, explaining that the procedure is not painful and only moderately uncomfortable. If the co-operative patient experiences pain, it is probably an indication of poor technic.

Careful digital examination should always be carried out prior to insertion of the sigmoidoscope, and passage of the instrument should be done under direct visualization, never advancing unless one clearly sees the lumen. Occasionally, we cautiously insufflate the rectum with air as an adjunct in passing the sigmoidoscope. Gentleness and caution must be observed at all times, because accidents can occur.[7,8] If the sigmoidoscope is inserted to a distance of 20 cm and difficulty is experienced at this point in further insertion, no attempt should be made to go the full 25 cm merely for the purpose of having done so. Most patients were examined to the full distance of 25 cm without difficulty.

In this series of 1,000 consecutive proctosigmoidoscopic examinations there were no accidents. Those patients in whom a lesion amenable to operation was found were referred to the surgical proctoscopy clinic; however, biopsies were taken for diagnostic purposes if indicated. In patients with ulcerative or inflammatory lesions or a history of diarrhea, smears and cultures were taken. The smears were examined immediately in our clinic.

DISCUSSION

Of 1,000 examinations, 747 (74.7 per cent) were normal. The distribution of patients by age at the time of examination is presented in figure 1. The greatest number of patients examined were in the 20-to 39-year age group. This is as expected and explains in part the high percentage of examinations showing normal findings.

Figure 2 presents the abnormal findings according to the age of the patient. Table 1 is a complete breakdown of the abnormal findings according to the patient's age and the diagnosis.

In analyzing table 1, the findings do not necessarily represent a true distribution of abnormalities of the rectosigmoid region as seen through the proctosigmoidoscope. Patients with lesions considered to be obviously correctible surgically are usually referred directly to the surgical proctoscopy clinic by the referring physician and therefore do not come through our service. We believe that this analysis is all the more important because a large percentage of the examinations were carried out on patients who had no symptoms referable to the lower bowel, and in whom the referring physician suspected no bowel disease. An attempt was made to determine the percentage of patients examined in whom no disease was suspected, but this was not possible from the available data. Many of the outpatients were examined for complaints of diarrhea, constipation, or bloody stools.

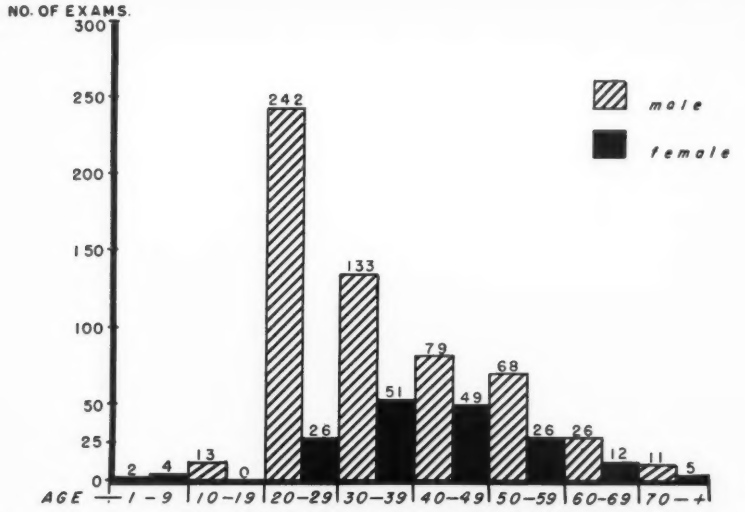

Figure 1. Age and sex (absolute numbers) of patients with normal findings on proctoscopic examination.

The importance of proctosigmoidoscopy in evaluating the patient with diarrhea was pointed out by Cooper[9] and by Bargen.[10] Bargen stated that proctoscopic examination is the second most important test in determining the cause of diarrhea, being superseded only by bacteriologic and microscopic study of the stool itself.

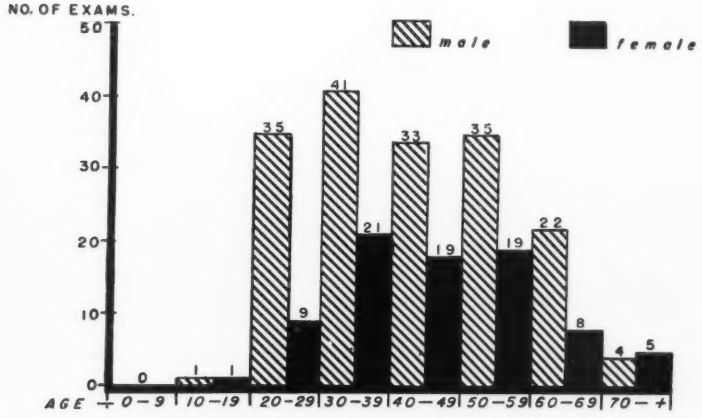

Figure 2. Age and sex (absolute numbers) of patients with abnormal findings on proctoscopic examination.

TABLE 1. *Distribution by sex and age of patients with abnormal findings on proctoscopic examination*

DIAGNOSIS	age 10–19 M	10–19 F	20–29 M	20–29 F	30–39 M	30–39 F	40–49 M	40–49 F	50–59 M	50–59 F	60–69 M	60–69 F	70– + M	70– + F	cases per 1000	% of total cases
AMEBIASIS					6	1	1			1					9	0.9
CARCINOMA									1	1	3	1	1	1	8	0.8
DIVERTICULA														2	2	0.2
FISSURE IN ANO			4		2	2	1	2	3	1					15	1.5
HEMORRHOIDS		1	9	4	8	6	10	6	4	9	11				68	6.8
NON SPECIFIC INFLAMMATORY PROCESS			7	2	10	4	7	2	10	3	5	2			52	5.2
BENIGN ADENOMATOUS POLYPS			7		5	3	7	3	8	1	3	4	3	2	46	4.6
* SCHISTOSOMIASIS			2		1			1							4	0.4
SPASTIC BOWEL	1				3	1	3	3	8	3					22	2.2
ULCERATIVE COLITIS			6	3	6	4	4	2	1			1			27	2.7

* *Proven by biopsy on Clinically Suspected Cases*

Amebiasis was detected in 0.9 per cent of the patients examined. This figure refers, however, only to those in whom lesions suspected of being amebic in origin were found. Smears were not taken unless there was a history of diarrhea or ulcerations of the mucosa were observed.

Carcinoma was found in 0.8 per cent of the total number of patients examined. In our series, all patients with this diagnosis were over the age of 50 years. The diagnosis was proved by biopsy.

Fissure-in-ano or hemorrhoids were found in 8.3 per cent of the patients examined, and occurred predominantly in the military age group. Nonspecific inflammatory lesions such as papillitis, cryptitis, and proctitis were found in 5.2 per cent.

Ulcerative colitis was diagnosed in 2.7 per cent of the patients. All of these patients had symptoms. Distribution by age shows that the majority were in the 20- to 40-year age group, as one would expect.

The most important statistic obtained in this analysis was, in our opinion, the confirmation of the frequency of polyposis of the rectosigmoid colon. This lesion occurred in 4.6 per cent of the entire group. Other investigators found the frequency of polyposis to be 12.3 per cent (by Christianson and Tenner[11]), 5.3 per cent (by Steele and Brown[1]), and 3.5 per cent (by Rossien, Reuling, and Lakes[3]). Young[12] reported that 8.8 per cent of 500 asymptomatic patients examined by him were found to have polyps.

The importance of polyps as premalignant lesions has been pointed out by several authors.[13-16] Runyeon[2] stated that 80 per cent of cancers of the bowel are in the rectum and sigmoid colon, and that 90 per cent of these cancers can be visualized with the proctoscope. Furthermore, 75 per cent of malignant tumors of the large bowel develop from adenomas. It is important to note that, although polyposis is more frequent in patients in the older age groups, one third of our cases occurred in persons under 39 years of age.

SUMMARY AND CONCLUSIONS

The findings in 1,000 consecutive proctosigmoidoscopic examinations are reviewed and pertinent conclusions drawn. Of these findings, 25.3 per cent were abnormal in spite of the youth of the majority of patients examined. The incidence of polyposis was 4.6 per cent of the total number of patients examined. One third of the patients found to have polyps were under the age of 39 years. It is our opinion that the frequency of abnormal findings and the potentially serious import of the lesions found justify the routine use of the proctoscope. We are of the opinion that it provides a simple, quick, and efficient method for evaluating the patient with gastro-intestinal disease.

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Clinicopathologic Conference

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POSTPARTUM HEMIPLEGIA

Summary of Clinical History. A 32-year-old married white female dependent was admitted in labor to the obstetric service on approximately the expected day of confinement. She gave a history of having had "flu" two weeks prior to admission, accompanied by chills and fever, headache, and stiff neck. At that time her friends noted that she was lethargic and despondent and complained of numbness in the left arm. Four days prior to her confinement her temperature was 102°F; she was given penicillin and Terramycin (brand of oxytetracycline) at a dispensary. It was thought that she had an upper respiratory infection.

The past history revealed that the patient had had three other pregnancies, the second of which, five years previously, had resulted in an abortion after four and one-half months' gestation. This was followed by pyelitis. Following the delivery of her second full-term pregnancy four years previously, she had fainting spells and weakness. Her father noted that the pupils were unequal on one occasion. There was no diplopia, tinnitus, nocturia, or dysuria. A thyroidectomy had been performed two years ago.

Physical Examination. On admission no abnormal findings were noted. The patient was slightly obese. The blood pressure was 110/68 mm Hg. At 0420 hours on the second hospital day she was delivered of a viable male infant under nitrous oxide and oxygen and local anesthesia. Low forceps were used, and an episiotomy performed. Post partum she was noted to be "bland" toward the infant and about the delivery. One hour later she was unable to comprehend simple commands and at 0630 hours a left hemiplegia and facial asymmetry were noted. Examination at this time showed her to be semistuperous, confused, and disoriented. Respirations were 18/min. The blood pressure was 130/90 mm Hg; temperature, 98.6°F; and pulse rate, 90/min. She had a stiff neck and the entire trunk could be lifted by the head. There was no diplopia.

*Rear Adm. John Q. Owsley (MC) USN, Commanding Officer. From the Neurology Service, Comdr. Henry S. Colony (MC) USN, Chief.

Neurologic examination revealed a complete left hemiplegia, more marked in the arm and face. There was diminished sensation on the left side and a suggestive left homonymous hemianopsia. The head and eyes were deviated to the right. A Babinski sign was present on the left with bilateral increased deep tendon reflexes. The fundi were not visualized.

Laboratory Studies. Lumbar puncture showed an initial pressure of 220 mm of water; there were 100 red blood cells and 660 white blood cells per μl with 98 per cent lymphocytes. The total protein was 100.8 mg per 100 ml, and the Pandy test was positive. The spinal fluid chlorides were 124 meq/l, and sugar was 41 mg per 100 ml.

Tests on the second hospital day showed that the Kahn reaction was negative, the blood was Rh positive, and the urine was normal. On the third hospital day the hemoglobin was 13 g per 100 ml. The white blood cell count was 12,400 per μl, with 73 per cent segmented neutrophils, 21 per cent lymphocytes, 5 per cent monocytes, and 1 per cent basophils. The sedimentation rate was 53 mm/hr, and urinalysis showed 10 to 12 white blood cells per low power field. A roentgenogram of the chest was negative. The blood sugar was 122 mg per 100 ml.

On the fifth hospital day the hemoglobin was 10.5 g per 100 ml, and the white blood cell count was 10,000 per μl, with 81 per cent segmented neutrophils, 15 per cent lymphocytes, and 2 per cent eosinophils. Blood urea nitrogen was 7.2 mg per 100 ml. Serum chlorides were 102 meq/l; calcium, 4.4 meq/l; sodium, 122 meq/l; and potassium, 5.1 meq/l. Total protein was 5.0 (albumin 2.1, globulin 2.9) g per 100 ml.

A blood culture on the eighth hospital day showed beta- and non-hemolytic staphylococci (coagulase negative). Spinal fluid and urine cultures showed no bacterial growth, and sputum and stool examinations were negative. The spinal fluid was clear; there were 17 red blood cells, and 64 white blood cells with 51 lymphocytes. Glucose was 25 mg per 100 ml; protein, 77 mg per 100 ml; and chloride, 113 meq/l. The findings of the colloidal gold and Kahn tests were negative. The blood sugar was 130 mg per 100 ml.

Three electrocardiograms, each on a separate day, were interpreted as essentially normal. The hemoglobin on the tenth hospital day was 11 g per 100 ml; the white blood cell count was 8,500 per μl, with 78 per cent segmented neutrophils, 12 per cent lymphocytes, 6 per cent monocytes, 2 per cent eosinophils, and 2 per cent basophils.

Course in Hospital. On the third hospital day the patient's temperature was 104°F rectally; she was incontinent of urine and

semistuperous. A neurosurgical consultation recorded no murmurs over the skull; the right pupil was seen to be smaller than the left and the left eye ground showed swelling of the disk. A tuberculin test (first-strength PPD) was negative at 24 and 48 hours. There was no change in her condition for the next few days, but on the fifth hospital day it was noted that she had a lesion at the tip of her nose that was increasing in size. The following day there was questionable periorbital swelling on the left side. On the seventh hospital day her respirations became more rapid and she was in coma. The pupils were equal and reacted. She developed difficulty in breathing, and a tracheotomy was done.

On the eighth hospital day the temperature was 106°F; pulse, 130; respirations, 44; and blood pressure, 150/80 mm Hg. Reflexes were depressed, and no Babinski sign was noted. Therapy consisted of oxygen by tent, intravenous and tube feedings, antibiotics, and general supportive measures. There was no essential change in her condition after the acute onset of the illness. Her temperature, pulse, and respirations were all elevated and showed no response to therapy. Her course was progressively downhill, and she died on the tenth hospital day after a day of gasping respirations.

DISCUSSION

Doctor Jacobs:* This is the case of a woman who entered the hospital in labor and shortly thereafter delivered a viable child. A few hours after the delivery she developed a left hemiplegia with deviation of the head and eyes to the right, stiff neck, and inability to communicate. Her course was steadily downhill, and marked by fever, questionable papilledema, and swelling around the left eye. There was a past history of kidney infections and shortly before admission she had fever, stiff neck, right-sided headaches, and numbness in the left arm. There is no note concerning her handedness. Blood studies revealed very little response to the severe infection, and the spinal fluid showed evidence of a pyogenic process—many white blood cells and a low spinal fluid sugar.

It is evident that she had a severe meningitis, but the etiologic agent was not determined by routine laboratory methods, and there was no response to the usual antibiotics. She had typical signs of a right middle cerebral artery occlusion, hemihypalgesia, hemianopsia, increased tone and reflexes with pathologic toe signs such as the Babinski, and hemiplegia most marked in the upper extremity. The deviation of the head and eyes is consistent with a lesion of that distribution and is due to a destruction of the frontal areas governing eye movement that let the unopposed action of the normal side turn the head. This picture may also be seen in a carotid artery thrombosis, but no mention was made of whether or not the carotid arteries were palpated. Assuming

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that she was right handed, her inability to speak should have been caused by a lesion in the left hemisphere; therefore, there probably were multiple lesions. The numbness of the left arm (two weeks prior to her admission) helps localize the lesion of the right hemisphere to the post central gyrus. The possibility of a cavernous sinus thrombosis is raised by the lesion on her nose and the swelling of the left eye. Anatomically, the patient can be said to have had a severe, diffuse meningitis due to a pyogenic organism; multiple cerebral lesions, most likely of the frontal lobes; and septic thrombosis of the right middle cerebral artery.

The causes of the disease can next be considered. Tuberculosis, syphilis, and the usual pyogenic organisms can be ruled out. A coagulase negative staphylococcus was grown and this may be pathogenic in certain conditions. No mention is made of cultures for yeast or fungi, but in such infections there is usually pulmonary involvement before the central nervous system is involved, and the chest film was reported as negative. The only other clue is the history of pyelitis, which may have given rise to a brain abscess that was silent for a period of years.

Sudden hemiplegias have often been described following deliveries. They usually result in a complete recovery, and meningitis is not part of the clinical picture. An embolus of septic material, amniotic particles, or air entering the circulation of the brain via the paravertebral veins or through an interatrial defect has been suggested. An aneurysm may produce similar signs, but with leakage, bloody spinal fluid would be found.

Because brain abscesses are often the cause of "aseptic meningitis," are often silent and multiple, and may rupture to produce a diffuse meningitis, my first diagnosis would be this plus septic occlusion of the right middle cerebral artery. My second diagnosis would be a fungus infection of some type. These organisms in the spinal fluid are often called red cells, oil droplets or lymphocytes. In this state (California) coccidioidal infections are common, but cryptococcosis, blastomycosis, and actinomycosis are also common, and all can give the clinical picture seen in this patient.

Doctor Norris:* Doctor Jacobs, why do you say that the lesions are necessarily bilateral in the frontal lobes?

Doctor Jacobs: Usually in a vascular accident you do not find too much confusion or disorientation. A person can get along well without one frontal lobe, but when both are involved marked confusion is present.

Doctor Simon:** What about a silent brain abscess? Isn't that a rare phenomenon?

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*Capt. Frank T. Norris (MC) USN, Assistant Chief of Medicine, Medical Service.
**Lt. Daniel S. Simon (MC) USNR, Staff Medical Service.

Doctor Jacobs: They are not unusual. There are cases on record where the patient died suddenly of a ruptured brain abscess without previous complaints.

Doctor Ashor:* Was there disk edema only on the left?

Doctor Colony: There is no record of both fundi being visualized by any examiner. However, it would not make any difference. We can assume that there was bilateral edema from the spinal fluid pressure reading.

Clinical Diagnoses:

1. Cerebral vascular accident
2. Aneurysm at the circle of Willis

Dr. Jacobs' diagnoses:

1. Multiple brain abscesses (meningitis, diffuse, secondary to abscess rupture)
2. Fungus infection (coccidioidomycosis, actinomycosis, blastomycosis, or cryptococcosis)

PATHOLOGIC FINDINGS

Doctor Kreissl:** As you will notice in figure 1, we have suppurative granulomatous foci, within which are seen numerous coccidioidal bodies of varying sizes. Most are of larger size and contain numerous endospores characteristic of the propagation patterns of this fungus (fig. 2). There are profuse numbers of neutrophilic polymorphonuclear leukocytes and loss of architecture in the immediate vicinity, with a reactive fibrotic process at the margins. The second slide taken from the lung again reveals a distinct, suppurative granulomatous area with numerous coccidioidal bodies containing endospores. In some areas of this organ these lesions are well defined, but in other areas of the lungs a rather diffuse, pneumonic appearance with almost complete obliteration of architectural identification is the observed pattern. In the thyroid gland there is almost complete obliteration of the architecture with numerous conglomerate granulomatous foci characterized by many coccidioidal bodies and a rather marked fibrotic process. Numerous sections from the basilar area of the brain again present infiltration of the coccidioidal bodies along with a marked inflammatory reaction made up of many neutrophilic polymorphonuclear leukocytes, lymphocytes, macrophages, and some giant cells.

In addition, there are a fibrinofibrous thickening of the entire leptomeninges (fig. 3), rather marked necrosis, and some reactive gliosis of the adjoining cerebrum. The entire pathologic picture is one of a diffuse coccidioidomycosis with principally pneumonic areas of infection and

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**Lt. Comdr. Leonard J. Kreissl, Jr., (MC) USNR, Assistant Pathologist, Pathology Service.

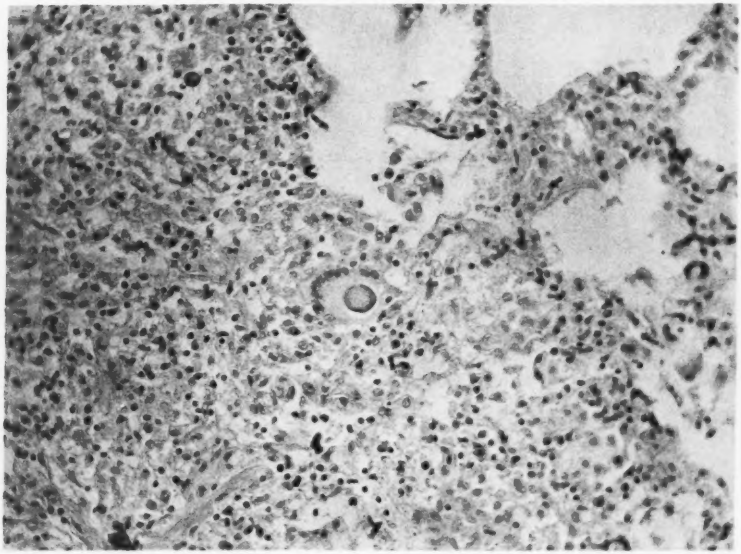

Figure 1. Section of lung showing the granulomatous response with a coccidioidal body within a giant cell. (× 200)

with a marked involvement of the thyroid gland, the brain stem, the basilar meninges, and the entire basal ganglion area. From the appearance and the degree of fibrosis found in the various organs one must

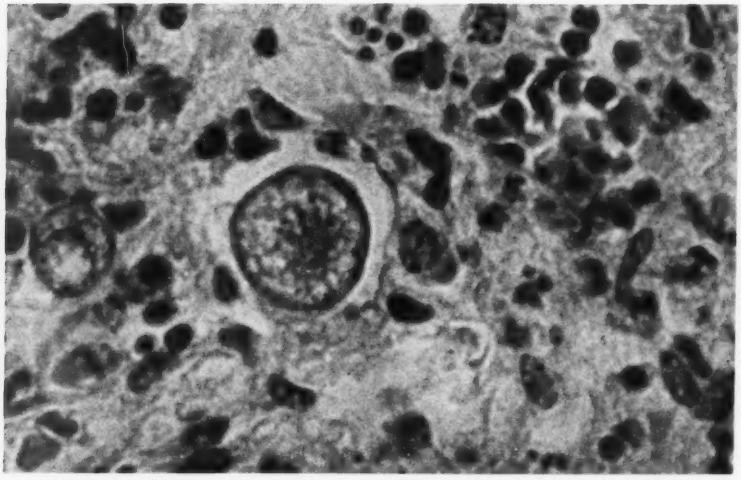

Figure 2. Coccidioides immitis, showing the contained endospores. (× 900)

surmise that the lesion had been present for a period of months, the history of treatment for respiratory infection two weeks prior to delivery in no way being indicative of the initial time of infection. The appearance of the lesions of the thyroid gland suggests that these lesions are more chronic than acute in nature, and the same is true of the cerebral lesions.

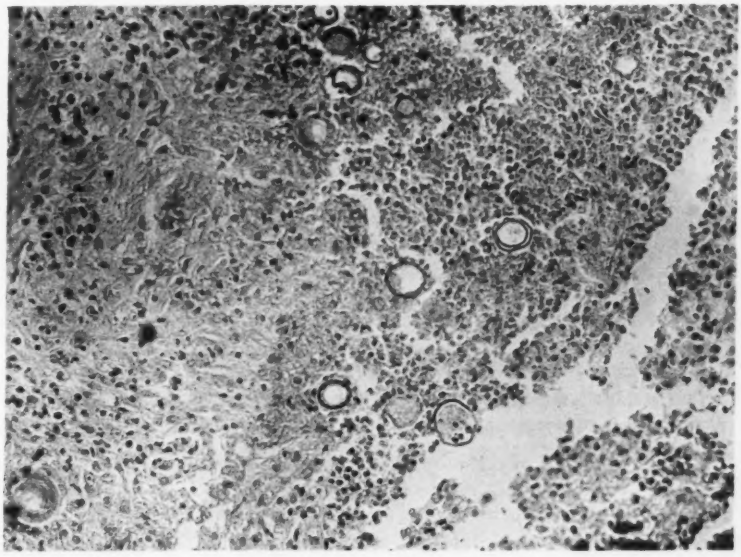

Figure 3. Section from the meninges showing numerous coccidioidal bodies of varying sizes within a suppurative process. (× 200)

Because no biopsy of the cutaneous lesion of the nose was done, we can only speculate as to its being a manifestation of the cutaneous phase of this disease. The lesion is most often seen on the exposed surfaces of the skin, but may appear in other areas, especially the neck. The primary skin lesion begins as a painless, solid nodule with pink to dusky red discoloration.

Anatomic diagnosis:

Coccidioidomycosis, generalized, with coccidioidal meningitis and coccidioidal pneumonia, all lobes

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Someday the generous rich will discover the advantage of endowing individuals instead of colleges.

—Martin T. Fischer

A PROPOSED BEHAVIOR PATTERN FOR MESS INSPECTORS

MARLO E. SMITH, *Major, MSC, USA*

ONE OF THE continuing duties of Medical Service personnel is making sanitary inspections of Army food facilities of all kinds. Army regulations give the installation surgeon the primary responsibility for conducting sanitary inspections, but he usually delegates the actual performance of this duty to other Medical Service officers or enlisted men—doctors, Medical Service Corps officers, or preventive medicine technicians with proper training and qualifications. Often these inspectors are young and relatively inexperienced, so to them these suggested rules of conduct and behavior are offered.

PURPOSES OF SANITARY INSPECTIONS

The Army has several reasons for requiring regular and frequent inspections of messes:

1. To find and recommend measures to correct *basic* sanitary defects, *i. e.*, those defects or practices that might cause or spread communicable diseases. Representatives of the Army Medical Services are charged primarily with preventing disease, and efforts should be directed toward this goal. By contrast, they are not particularly concerned with *esthetic* defects because these seldom have more than minor health significance. Besides, esthetic defects are usually corrected by other inspectors (*e. g.*, command) who are not professionally trained to find disease hazards. If medical inspectors confine their efforts to correction of disease hazards, they are on safe ground and can defend their criticisms and recommendations with technical facts and arguments. If they insist on criticizing purely esthetic defects they quickly find themselves unable to defend their point of view on a scientific basis and put themselves in the ridiculous position of being unable to prove that the defect has any health significance and is therefore any of their business. For example, it would be extremely difficult to prove scientifically that a sooty ceiling or soiled walls in a dining hall had potentialities for making someone sick. It is true that these conditions are esthetically unacceptable in a well-run mess, but they are of little health significance.

From Medical Section, Headquarters Second Army, Fort George G. Meade, Md.

2. Mess inspections promote the maintenance of a higher standard or "tone" of cleanliness. It is reasonable to assume, human nature being what it is, that if no inspections were ever made, messes would soon degenerate into sloppy, untidy, insanitary places because there would be little incentive for the mess personnel to clean them up.

3. The next reason is in some respects perhaps the most important of all. Medical inspectors can make their major contributions to mess sanitation during inspections by *teaching*. They possess specialized technical knowledge of the fundamental factors that cause and promote the spread of diseases through food. This information is not always known to mess personnel, and they must be taught. This can best be done by pointing out insanitary food-handling practices, poor personal hygiene, presence of insects or rodents, inadequate equipment and cleaning facilities, et cetera, explaining how these things can or might cause someone to get sick, and teaching the best means of correcting them. This educational responsibility cannot be discharged by anyone else but the Medical Service, which should take pride in its ability to do so.

4. From the military standpoint, one important reason for making mess inspections is to check for compliance with existing regulations. Many of these require conformance with sanitary and disease-prevention principles, and their contents and significance must be known to the mess inspector. When he finds them being violated, he should teach the correct procedure and explain their meaning and intent to the mess personnel. It follows, then, that a mess inspector must be thoroughly familiar with all regulations pertaining to his job. The most important ones can be found in the "Index to Official Publications Pertaining to Preventive Medicine," revised in March 1955 and published by the Preventive Medicine Division of the Surgeon General's Office. Besides these regulations, there are often local sanitary orders in effect which are usually in complete consonance with existing Army regulations but detailed with additional information and requirements applicable to the particular command and environment. In addition to the formal printed rules and regulations, an inspector needs (and cannot function without) a thorough understanding of the epidemiology of food-borne diseases. Also, common sense and a knowledge of the unwritten "common law" of food sanitation are important. Examples of violations of this common law are: handling silverware and other eating utensils on the surfaces that contact the mouth; washing soiled hands in dishwater; scratching the head, anus, or crotch; picking the nose or teeth; and many others.

5. A final reason, but by no means the least important, is to praise and give credit to personnel when they do an outstanding

job at mess sanitation. Army cooks prepare and serve three meals every day in the year and, like most housewives in private homes, are usually taken for granted and seldom thanked or complimented for their efforts. This is wrong; they should be. It is amazing how much more easily good sanitation can be attained with a little deserved praise where it is indicated than it can be with criticism.

TYPES OF MESS INSPECTIONS

In general, there are two types of mess inspections: scheduled and surprise, both of which have merit.

In a *scheduled* inspection, the inspector notifies a mess that he will inspect it at 1000 hours every Tuesday morning, for example. Obviously, with this advance notice of the exact date and hour of the inspection, the mess will be prepared; mess personnel will have it cleaned, scrubbed, polished, and shining by the time the inspector arrives. Most of the esthetic defects that normally exist in the mess will be corrected. Will the inspector be able to find the real sanitary defects under these conditions? Yes, probably. If he is alert and experienced, he will be able to find as many sanitary defects as if he had not announced the exact hour of his arrival. For example, he may find cross-connections in the plumbing; he can evaluate the efficiency of the dishwashing processes by examining the clean dishes or trays on the racks (if they are wet it is manifest they were not exposed to a rinse temperature of 180°F because this temperature will heat them sufficiently to air-dry almost instantly); he can observe the fitting of the screening and evaluate its efficiency in excluding flies from the mess; he can look for evidence of rodent infestation—rat runs, droppings on shelves, holes; he can learn a lot about the personal hygiene habits of the mess personnel by observing the length and cleanliness of their fingernails, their general appearance, and the manner in which they go about their duties.

A *surprise* inspection is unannounced beforehand. It also has value. For example, if it is desired to see the food serving, the mess must be visited during a meal; to check the food preparation, during the hours when the meal is being prepared. There is a temptation during a surprise inspection to observe and concentrate on esthetic defects and current housekeeping confusion. This should be avoided. In fact, it will help to improve relations with the mess personnel if the inspector takes time to reassure them that he is not interested in, or even looking at, the rush hour confusion and disorder.

Naturally, of the two types, the scheduled inspection tends more "to win friends and influence people." In the long run, more

harmonious relations with the mess personnel and better mess sanitation will be obtained by making inspections on a prearranged schedule. However, an occasional surprise inspection, if done tactfully, will do no harm and can do some good by revealing defects not apparent during scheduled inspections.

The best hour of the day to make a scheduled inspection is in the morning at 1000 hours. By that time, the daily routine cleaning has been done, the mess is ready for inspection, and preparations for the noon meal have only begun. The second best time is in the afternoon at 1400 hours. Mess personnel will feel more kindly toward inspections if timed to conform with their routine.

THE BASIC RULE OF BEHAVIOR

By now it must be apparent that a general policy for the behavior of a mess inspector is emerging from this discussion. This behavior consists essentially of observing the Golden Rule. In other words, the inspector should conduct himself toward those he is inspecting in the same considerate manner he would like them to use if their positions were reversed. If this policy seems "corny" or "unmilitary," please do not discard it without a reasonable trial. Military personnel react favorably to kindness, courtesy, and tactful treatment; putting on a uniform does not change the essential nature of a man.

AUTHORITY TO INSPECT

An inspector needs authority from higher headquarters to conduct inspections; this authority may be automatic. A post medical inspector, for example, will have blanket authority from the post commander to inspect post food facilities. A battalion surgeon is authorized by his battalion commander to inspect battalion messes. A division medical inspector is authorized by the commanding general, through the division surgeon, to inspect any division facility for health hazards. It appears, then, that mess inspectors have a great amount of delegated authority and power. This is true; figuratively, they carry "a big stick." However, it is cautioned that this power must never be abused. Much better co-operation from mess personnel and better mess sanitation can be achieved through kindness, patience, education, and helpfulness than can ever be obtained through fear, threat, or waving "the big stick."

STAFF AND COMMAND

An inspector acts as a *staff* officer and has no power or authority to *command*. The function of a staff officer is to advise and recommend; in the case of a medical staff officer this means advice and recommendations on matters pertaining to the health of troops. A common failing of mess inspectors is a tendency to be overly impressed with their authority to the extent that

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they attempt to *give orders* to mess personnel. Orders of this kind are illegal and need not be complied with. Inspectors are cautioned to avoid issuing orders to correct defects, or even leaving the impression that they are giving orders; instead they must confine themselves solely to offering advice, information, and recommendations, leaving it to the commanding officer to use them if he chooses. The Medical Service fulfills its mission by advising commanders on medical matters, not by giving orders.

PROCEDURE FOR MAKING INSPECTIONS

Consider, for example, a battalion surgeon inspecting the company messes of his battalion. Having his commander's blanket authority, he chooses to inspect the mess of Company A at 1000 hours on Friday morning. Shortly before this hour he reports to the commanding officer of Company A, identifies himself, and requests permission to inspect the mess. This is necessary for several reasons: (1) it observes the formality of military channels; (2) it is good manners; (3) it makes the commander *feel good* toward the inspector; and (4) it creates and cultivates a feeling of good will and enlists his co-operation. Conversely, it is definitely *not* good manners to go "snooping" through a mess hall without consulting the man in charge of it. Such behavior may precipitate ill feeling toward the inspector in addition to some embarrassing moments when he is called to task for bad manners and failure to follow military channels.

Having obtained the permission of the company commander to inspect his mess (he will always give his permission), the inspector requests his company on the inspection so he can hear the advice, comments, recommendations, and criticisms first hand. He may agree to this or, if unable to do so, he may send a subordinate (mess officer usually). This is satisfactory; the important thing is to have *someone* representing command on the inspection.

While the following rules add up to good manners, common sense, and observance of the Golden Rule, inexperienced inspectors often violate them and thus jeopardize the attainment of their primary goal of achieving clean, healthful mess facilities.

First, he should have a proper attitude and a clear understanding of his mission. He is performing this duty primarily to teach the principles of disease prevention, to look for and obtain corrections of sanitary defects, and to check compliance with regulations—not to criticize. Criticism is the least important of his duties and, when it must be resorted to, it produces the least effective results.

He should not find fault unnecessarily. It is better in the long run to find two or three *real* sanitary defects on each inspection

than to call attention to a hundred minor and relatively unimportant ones. It is not necessary to find all the faults on the first visit; it is better to save a few defects for succeeding visits. In the process of pointing out defects, compliments should be offered if some piece of equipment has an unusually fine appearance or some procedure appears efficient or clever.

If the inspector asks questions (and he should), he must be sure to use a pleasant tone of voice. He should remember the Golden Rule and picture himself in the other fellow's position. A question will get a quicker and better answer if it is framed in a friendly, inquiring tone of voice. *Never be sarcastic;* this is always injurious in dealing with people.

Always observe "channels." If an inspector feels compelled to criticize something, perhaps one of the cooks doing something insanitary, he should quietly direct his corrective remarks to the mess supervisor accompanying him on the inspection. The supervisor is the representative of command authorized to give a legal order to the offending person.

Always make criticisms in a manner that will not cause the criticized man to "lose face." This is in accordance with the unwritten law of military custom which requires that *a person should never be criticized in the presence or hearing of his subordinates.* If it is desired to criticize the mess steward or mess officer, the inspector should take him aside and direct his remarks to that person alone, and never in a loud tone of voice that can be heard by his subordinates.

Perhaps the most damaging and most frequent error in common sense is when the inspector makes silly or unreasonable recommendations. Above all else, he must be a reasonable person. If he makes just one silly, ill-conceived, and impossible-to-comply-with recommendation, he is through as a useful mess inspector. No matter how brilliant or hard-working he is in the future, his value in that mess is ended. It is much better and safer to say nothing—that is, make no recommendations at all—than to make one that is foolish. In the beginning, while acquiring experience at inspecting, it is better for an inspector to observe, ask questions about, and comment on only those things he is absolutely sure about.

If an inspector does criticize something he sees in a mess, he should by all means have a better solution ready. If he points out that a certain food-handling practice is wrong and the mess personnel say, "OK, it's wrong; tell us how to do it right," he must be prepared with a sound, sensible, and practical alternative or he will feel very foolish.

One general contribution that an inspector can make toward improvement of the Army Food Service is to observe and pass on clever ideas or labor-saving tricks from one mess to another. This helps to raise the general tone of all messes and, because most mess personnel appreciate such suggestions, will make him a welcome visitor on succeeding inspections.

REPORTS

Many kinds of reports are used in the Army and there is no standard type. The superior officer who requested the inspections may require formal written reports on the findings and recommendations for his information and action, or he may request only brief, informal reports, either oral or written, or no reports at all unless the inspection reveals defects that require command action.

Many posts, camps, and stations, and some tactical units have mess inspection report forms, usually mimeographed, that were prepared by previous inspectors. If none exist, an inspector may want to prepare one for his own convenience. Report forms generally consist of a listing of the various features of the average mess, a list of the common defects likely to be found, or both. They may have a space or column in which a check mark, an "S" (for satisfactory) and a "U" (for unsatisfactory), or a numerical percentage rating may be placed. Any of these devices, or a combination of them, may be useful.

However, certain cautions are in order if a check list is used, especially if a copy of it is left in the mess. It should not be used either as an excuse to neglect proper preparation for the job of inspector or as a crutch to compensate for failure to learn it. The "superficial, check-list guided, whirlwind" type of inspection is inexcusable. A check list is useful sometimes for new inspectors to ensure orderliness of approach and completeness of effort, especially in large messes, but if improperly used it can be the source of a mass of "replies by indorsement." Also, by their very brevity, check lists tend to be cold, factual presentations of the faults and shortcomings in a mess and thus tend to block good relations with the mess personnel rather than aid in establishing a harmonious working relationship. A rating of satisfactory is usually construed to span a percentage range of 50 per cent and allows no easy opportunity to indicate that something is not merely "satisfactory" but "superior." If percentage ratings of the various features of a military mess are preferred, perhaps in an effort to compare numerically one mess with another, that technic has its faults too. The main weakness lies in the impossibility of placing an exact or even comparable percentage value on each element of the mess. A good example of this was an inspection report form used in Italy in 1946. In

this form, some 30 to 40 different elements of mess sanitation were listed and each assigned a percentage value ranging from one to three points. Dishwashing was arbitrarily given the maximum value of three. The item "Compliance with the Master Menu" was also allowed three points. Therefore, a mess which served wax beans instead of green peas on a certain inspection date committed equally as serious a sin as another mess that washed its dishes in sewage. Assuming that every other item in both messes was perfect, both would be rated 97 per cent. Is meticulous compliance with the master menu equivalent to good dishwashing? Can these two messes be considered equivalent from a health point of view? Just how important, then, is dishwashing? Can an exact percentage figure be placed on its value in comparison with all other aspects of mess sanitation?

In order to be able to present this report in orderly fashion and cover all the necessary points, the inspector may elect to take notes during the inspection. Some inexperienced inspectors take these notes in a secret manner, carefully hiding them from the view of the mess personnel. After completing the inspection, without saying a word to anyone in the mess, they rush back to the office and type up a nasty report about the mess and its operating personnel. This "gestapo" report is then sent up to the commanding officer with recommendations for command action to correct the sanitary defects. If the recommendations look sensible and appeal to him, the commander will usually force the mess personnel to make the recommended corrections. They will do so, but what kind of attitude will they have toward an inspector who behaves like that? Exactly the same procedure will have to be used in all future inspections. Future visits of the inspector to that mess will be as unpleasant as the mess personnel can legally make them.

It is far better to take notes in an open and above-board manner. Then after the inspection is over, the inspector can sit down with the man in charge (perhaps over cups of coffee) and discuss the various shortcomings of the mess, item by item, in a friendly, co-operative way. The supervisor should be given an opportunity to explain the defects, and a chance to correct them before the next inspection. If there are items on the list that are impossible for him to correct (lack of equipment or materials, poor or irregular garbage service, malfunctioning dishwashing machines, et cetera), defects previously called to his attention that remain uncorrected, or any other defects serious enough to warrant reporting to the commanding officer, he should be told about them and advised in detail which ones are to be included in the report. Then, if the report turns out to be critical of the mess, he will not feel nearly so hostile as if he had not been warned of its contents.

Patience is an extremely important asset for an inspector to develop. He should give the mess personnel a chance, or several chances, to correct sanitary defects before they are reported officially to superiors. When he is convinced that the defects are never going to be corrected without command action, that is the time to "bear down." This is a permissible plan of action which must be resorted to on occasion. While it has been suggested in this discussion that better and quicker results are usually achieved by keeping relationships with mess personnel on a "me and thee" basis, sometimes mess personnel, through ignorance or stubbornness, refuse to comply with suggestions and recommendations and thus force the use of sterner measures by invoking command action.

For simplicity, this discussion of a proposed behavior and attitude pattern for Medical Service inspectors has been limited to mess inspections. However, it is felt that these common-sense rules can be adapted for any kind of medical or sanitary inspection. Remember that the medical inspector is the teacher, the doctor, the health adviser—not the disciplinarian or commander.

THE PREVALENCE OF MALNUTRITION

"The great prevalence of malnutrition among chronically disabled persons, as revealed by this study, in a country so well stocked with food as the United States, is frustrating and irksome, if not actually shocking. The importance of the present observations is further accentuated by recent study showing that malnutrition per se is the sixth highest cause of prolonged disability. In other words, these malnourished individuals could have remained well and normally active if they had not failed to consume an adequate diet. Undernutrition, with its various manifestations, is not a disease exclusive of the chronically ill and the aged, but occurs in the so-called normal population as well. Actually, it will be pointed out that the incidence of undernutrition and underweight among so-called 'healthy' individuals (33%) is almost as great as the incidence of this condition among sick people."

—JOSEPH I. GOODMAN, M. D., and
WILLIAM DOWDELL, M. D.
in *Annals of Internal Medicine*
p. 1253, Dec. 1955

LETTER TO A DEPENDENT

The Complex Problem of Medical Care In the Armed Services*

BENNETT F. AVERY, *Captain, MC, USN*

THE PROBLEM of providing medical care for members of the Armed Forces is large, complex, and consuming of manpower and money. It is an even greater problem when the servicemen's dependents are involved. This report discusses the shortages that threaten the extent or quality of medical care, the all-out effort being made to look after military families properly, and the need for laws supplying the means and personnel to provide adequate family care without endangering military medical readiness.

A serious shortage of career medical officers has made it necessary to draft numerous men who are serving involuntarily and for a short term only. This is often at considerable personal sacrifice, and not everyone is happy about it. All the more honor to the vast majority, who accept their call to service with loyalty and good grace, doing their best to keep the Navy well and to give the finest possible treatment to those who do become sick.

However, even these men to whom so much credit is due have one problem;—they are in for such a short period that by the time they are really oriented they are due for release.

Not only is the Medical Department acutely short of career personnel; the total allowance of *all* medical personnel, military and civilian, has recently been cut so heavily and with so little relation to the actual, continuing workload as to force radical redeployment of medical forces, leaving the medical departments of some ships and stations badly depleted.

Since June 1914 the Navy has been authorized by Congress to have 6.5 medical officers for each 1,000 of active duty troop strength. This figure was reaffirmed by the 80th Congress in 1947, but the Navy kept a continual check on the current needs of each ship and station, and in the spring of 1953 was operating on a ratio of 4.2 per 1,000 troops, rather than the legally authorized ratio of 6.5.

*This article, with a longer introduction, appeared as "Keeping the Bluejacket and His Family Healthy" in *Our Navy* 50: 4, Feb. 15, 1956. It is reproduced here, with the kind permission of the Editor and Publisher of that magazine, because the problems discussed concern equally all three of the armed services.

From Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.

At that time the Navy was directed to reduce the number of medical officers on active duty to 3.26 for each 1,000 troops. This forced the loss of more than 1,000 medical officers between July 1953 and July 1955;—about one medical officer in every four!

You should realize what that 3.26 per 1,000 troops actually means in practice. The personnel included in troop strength, upon which the number of medical officers is based, are less than half of the people for whom medical care must be furnished by medical officers of the Navy.

To take a period for which we have the figures—in early 1954 the Medical Department was responsible for the medical support of over 2,334,000 persons, of whom only about 986,500 were military personnel. The present proportion between the total group and its military component remains essentially unchanged, so you can see that the actual, imposed ratio of medical officers to the personnel they serve is not 3.26 but 1.55 per thousand.

In addition to hundreds of thousands of retired personnel and service dependents who are given care in compliance with law, there are about 400,000 civilian employees in naval industrial plants. These men must be given on-the-job medical care and be protected by an effective industrial hygiene program. Finally, we have to assign many medical officers to duties other than caring for the health of military personnel of the Navy and their dependents.

There are about 100 naval medical officers on board ships of the Military Sea Transportation Service, *although only 10 per cent of MSTS services are to the Navy.* Another 16 medical officers are assigned to Armed Forces Examining Stations, in excess of our pro rata share for naval personnel being examined; and 21 are serving with missions, military aid groups, and activities outside the Department of Defense.

You can see for yourself that to fill these extra billets and to provide medical care for dependents, retired personnel, and industrial employees makes heavy demands on naval medical officers that are not reflected in figures of troop strength. In addition, military medicine involves many duties and special skills not normally a part of civilian private practice; for instance, studies of supply problems and those peculiar to submarine or aviation medicine. These are necessary, but they increase the need for medical officers.

To add to the problem, we are faced with periodic cuts in civilian help even while patient care load is increasing. This hampers plans to meet the shortage of military personnel by substituting civilians wherever possible; for instance, by hiring civilian physicians to replace medical officers in naval industrial plants and

employing civilians for some of the duties usually assigned to hospital corpsmen—whose average work week in naval hospitals has been about 60 hours!

Naval hospitals already are using fewer personnel per 100 patients than any other comparable civilian, governmental, or military hospital system, and the quality of patient care must not under any circumstances be allowed to suffer; therefore any radical cut in civilian help could only be made by neglecting maintenance, skimping on guards, and reducing administrative staff.

This would mean increased expense in the long run for overdue repairs, while large cuts in administrative staff would be sure to cause costly and annoying delays in processing patients.

The critical medical officer shortage required long study of how to meet the situation in such a way as to supply the best medical care possible to military personnel and their dependents without too seriously decreasing military medical readiness. The study resulted in the adoption of a number of desirable measures; others, such as the last two listed, had to be included on the basis of what seemed the least disruptive to the Navy's mission. They are:

(1) A request that sea commands assign medical officers, when in port, to temporary additional duty at shore facilities, in order to aid in dependent care;

(2) Removal of medical officers from many small ships, with replacement by specially selected and trained hospital corpsmen. For many years this has been done in our submarine service, and it may have to be applied even more extensively than at present to other small ships such as destroyers and amphibious craft. Rapid air transportation, radio communication, new and more effective drugs, and better trained hospital corpsmen make it less vitally essential than it was formerly to have a medical officer always immediately at hand;

(3) Reduction in number of medical officers aboard such ships as did retain them. Even the largest cruisers have been reduced from 2 medical officers to 1, aircraft carriers from 3 to 2, and LST squadrons from 2 to 1;

(4) A continuing effort to hire civilian physicians to replace medical officers in naval industrial establishments;

(5) Assignment to non-professional personnel of all purely administrative tasks, retaining professional personnel only in those medical administrative assignments demanding professional knowledge;

(6) Reduction in number of medical officers assigned to shore

stations; including medical research, which is so vital to peacetime readiness planning;

(7) Reduction in number of training billets for medical officers.

* * *

Through these efforts it has been possible to give reasonably complete medical support to naval personnel and to maintain essential if not full medical care for military dependents; but at the expense of decreased research and training. This and other shortcomings have been accepted in hope of relief through an increased allowance of medical officers and passage by Congress of an adequate Dependents' Care Bill.

You may have noticed how often I have mentioned the necessity of providing adequate medical care for the immediate families of military personnel. Such dependent care has had a long and honorable history. The Appropriation Act passed by Congress in 1884, which has never been repealed, stated that medical officers shall *wherever practicable* attend the families of military personnel free of charge.

As years passed, personnel, particularly enlisted, came to depend on service-furnished medical care for their wives and children. What began as a privilege became a custom.

The general public came to believe that care of dependents was available to service personnel, and members of Congress repeatedly cited service dependent medical care in opposing pay raises. Finally, the custom became a right through passage by the 78th Congress of Public Law 51, which provided medical care for immediate families of military personnel *who were within range of naval establishments, to the extent that available facilities and personnel permitted.*

This privilege and custom, now become a legal right, has recently been under both open and insidious attack; but it has wise and powerful supporters. President Eisenhower in his State of the Union Message last year said: "I strongly urge more generous medical care of dependents."

The Moulton Commission, after exhaustive study, recommended in its report that medical care for dependents be continued and even extended in scope. The Surgeon General of the Navy, Rear Admiral Bartholomew W. Hogan, MC, USN, described in the 15 October 1955 issue of the *Army Navy Air Force Journal* the great effort being made to provide "assured and adequate medical care for authorized dependents of our fighting men." He stated emphatically that to maintain essential care for such dependents is "a legal and a moral obligation."

You all know how many service families are located on foreign stations or in isolated areas in continental United States where there either is no medical care available except for that provided by medical officers, or where the amount or quality is entirely inadequate. Consider Camp Pendleton, California, with over 29,400 dependents residing in an isolated spot; or Camp Lejeune, N. C., or Guantanamo Bay, Cuba, where there are no acceptable substitutes for the Navy's own doctors and medical facilities.

Because of severe shortages of personnel, military and civilian, it is a struggle to provide even the most essential medical care for authorized military dependents; but I can assure you that the Bureau of Medicine and Surgery, and Medical Department personnel in the field, are making a great effort to see that your families are not neglected.

As things now stand, if the wife or child needs medical attention, it can usually be obtained at a naval dispensary or hospital, if there is one in the area where they live.

This care includes either outpatient treatment or hospitalization if needed;—for which there is a nominal charge of $1.75 per day as compared with civilian hospital rates of from $12.00 to $25.00 or more.

It does not include dental treatment, except that if one of your family is a patient in a hospital and the doctors think that some dental condition such as an abscessed tooth is making him worse, they can have the tooth treated. Last year the *daily average number* of dependents being cared for in naval hospitals was 1,600, and it will be two or three hundred bigger when this year's figures are averaged.

The number of deliveries, in particular, has grown enormously since the end of World War II. In hospitals of the three armed services combined it went from about 42,000 in 1948 to over 145,000 in 1953, according to the report of the Hoover Commission Task Force on Federal Medical Services.

Outpatient service usually includes treatment for such emergencies as a broken arm or cut lip, as well as prenatal care and similar items. It does not include home visits by a medical officer except in real emergency, nor treatment for mental or contagious diseases or those requiring long-term hospitalization, such as tuberculosis. Even so, the volume of care given is surprisingly big:

On each day of the year about 40,000 outpatient visits and treatments are being given to members of military families in clinics and hospitals of the three armed services.

* * *

Naturally, in such a large operation there are frequent causes for complaints, and we wish that we could eliminate all of them.

The serviceman's wife may have had to answer a lot of questions to prove she was eligible to be treated, because she did not have either the old Dependents Card for Medical Care or the new, all-purpose Military Dependent Identification Card; but there are so many who have a right to treatment that the dispensary personnel must have some way of ruling out those who don't.

Or the dispensary may have been so crowded that after hours of waiting in line she gave up and came away without being seen by anyone, as certainly has happened.

The trouble here is that we *simply do not have enough* medical personnel and civilian help to go around. Both medical officers and corpsmen were probably staggering under the overload of work and physically unable to keep up with the crush of patients.

The solution may have to be found through an act of Congress. A bill sponsored by the Department of Defense and now before Congress would authorize military medical or civilian care of dependents, with costs shared by the government and the family; but *as the bill now stands* some of its provisions are only vaguely defined, and it does not seem to me to give enough attention to outpatient visits and treatments that are so important to a service family.

Other legislation to stregthen the badly depleted Regular Navy Medical Corps for its mission of protecting the health of all naval personnel in peace or war is urgently needed, and would at the same time help to meet the problem of providing essential care for the families of servicemen.

The entire situation is of such pressing importance that it seems something must be done, and soon. It is hoped that the 84th Congress will pass a really adequate Dependents' Care Bill; for we firmly believe, as was stated at the recent convention of The Association of Military Surgeons by Major General Dan C. Ogle, USAF (MC), Surgeon General of the United States Air Force, that "adequate medical care for the families of military personnel is a sound and highly economical contributing factor to a stronger defense stature."

The baby is just as dead when it dies of rickets as when it dies of undulant fever.—Martin T. Fischer

Constrictive Pericarditis

Report of an Unusual Case

GEORGE H. HAMILTON, *Major, MC, USA*
ELMORE M. ARONSTAM, *Lieutenant Colonel, MC, USA*

CONSTRICTIVE pericarditis, while one of the rarer problems the thoracic surgeon encounters, can probably be improved by operation in most cases. Recent contributions to our understanding of its pathophysiologic aspects reveal a fascinating interplay of mechanisms of disease.

The rarity of the syndrome is attested by the fact that in a review of 9,618 autopsies in a metropolitan hospital,[1] adherent pericardium was found in 130 cases, or 1.4 per cent. Of these 130, the pericardium was completely adherent in 17. A constrictive pericardium in the anatomic sense was present in only 7. Of these 7, only 4 demonstrated classical clinical signs of the disease; however, all 7 patients with totally adherent pericardium showed capillary sclerosis in the lungs, liver, and spleen, indicating that the 3 patients without clinical signs might be considered to have been in the early phases of the clinical syndrome. In addition to thickened, adherent, constricting pericardium, lesions such as typical pulmonary capillary sclerosis, cardiac fibrosis of the liver, phlebosclerosis of the hepatic veins and inferior vena cava, and congestive splenomegaly have been described. The degree of pulmonary capillary sclerosis, phlebosclerosis, and fibrosis of the liver is believed to be due to the duration of time these areas have been subjected to increased venous pressure rather than to the height of venous pressure. In addition to the above pathologic changes, a varying degree of myocardial atrophy, fibrosis, or myocarditis is seen.

As far as causes are concerned, in the 130 cases of adherent pericardium, rheumatic fever was implicated in 42.6 per cent, coronary thrombosis in 19.5 per cent, tuberculosis in 3.1 per cent, no apparent cause in 25.5 per cent, polyserositis with indeterminate endocarditis in 4.5 per cent, and miscellaneous causes in 2.2 per cent.

Staphylococci, scleroderma, and foreign bodies have been implicated as causative factors. The causative agent in most patients with symptoms due to constriction is probably *Mycobacterium tuberculosis*.

From Valley Forge Army Hospital, Phoenixville, Pa.

By using cardiac catheterization[2-4] and other ancillary procedures to study the syndrome produced by constrictive pericarditis, several important facts have been deduced. First, the basic derangement caused by the constricting scar about the heart is a mechanical interference with the filling and emptying of the ventricles. This results in a diminution of diastolic filling, a lower stroke volume, and decreased cardiac output. There has been no evidence from cardiac catheterization that scarring about the auricles or venae cavae has any significance in causing the increased venous pressure in this syndrome. No significant pressure drop has been noted between the venae cavae and the right auricle and ventricle.

Extremely significant are observations that pulmonary capillary pressures in these patients approximate the peripheral venous pressure. These patients have definite pulmonary congestion. It has been suggested that they are saved from pulmonary edema by a relatively weak right ventricle.

Because of the lowered cardiac output in these patients there is an increased extraction of oxygen from the blood and a greater arterial venous difference than in the normal person. The hypervolemia constantly observed in these patients may be related to this as a compensatory mechanism for assuring better oxygenation of the tissues.

Aside from the mechanical effects of compression, there is further evidence that myocardial failure, whether due to atrophy, fibrosis, or myocarditis, may play an important part in the syndrome of circulatory congestion. Hypervolemia may compound and worsen the problem. In certain instances, medical therapy has reversed the effects of these factors.

The surgical implications of the foregoing point to the fact that the primary surgical effort should be directed at decorticating at least the ventricles in as complete a fashion as possible. This is the accepted present-day practice. In preparation for operation, appropriate treatment against a causative agent such as *Myco. tuberculosis* is indicated and may, in certain instances, obviate the necessity for surgical intervention. Medical efforts at correction of myocarditis and myocardial failure should be made in order to render the patient as suitable an operative risk as possible. Timing of the operation is of as great importance here as in many other operative ventures.

Occasionally, the postoperative results in these patients are immediately apparent or dramatic. Following removal of ventricular constriction, the heart is observed to balloon outward. Most likely this represents a dilatation of atrophic or weakened myocardium. Postoperative heart failure and death have been reported in an occasional patient with a severe lesion, in whom the better

part of valor would probably have been to do the operation in stages, doing the left side first. It is easy to understand why improvement following operation may be prolonged several months until the myocardium regains its tone, strength, and proper size. In patients with long-standing disease—those with fibrosis of the liver and pulmonary capillary sclerosis—it is understandable that operation may not give as completely satisfactory a result as desired because of the residual liver damage or pulmonary sclerosis. Finally, an inadequate procedure may require reoperation for effective amelioration of the clinical syndrome.

The first cardiac decortication in America was done by Churchill[5] and reported in 1929. Since that time, the operation has been developed and rendered safer, principally by improved anesthesia and a better understanding of the basic physiologic principles involved. A satisfactory approach can be made either by a lateral thoracic incision or by an anterior transverse sternum-splitting incision. The latter gives, perhaps, better exposure but requires more attention to closure (sternal fixation) and more expert anesthesia because both sides of the chest are open simultaneously during the procedure. The latter incision is to be avoided in poor risk cases as ventilation is greatly diminished in the immediate postoperative period.

The risk of operation, because of technical difficulties due to adhesive plaques, perforation of a thin myocardium or auricle, damage to coronary arteries, postoperative heart failure, and liver failure, as well as to the more common complications of thoracic surgery, is appreciable. Mortality in well-prepared patients, however, should not be over 10 per cent except in a series of patients with most unfavorable prognoses.

Recently we saw a young patient with constrictive pericarditis, the cause of which was somewhat unusual. Because of this, and the relatively short duration of his disease, it is reported below.

CASE REPORT

A 19-year-old white man first noted the onset of exertional dyspnea, intermittent chills, malaise, and lassitude in January 1955. He was subsquently hospitalized and subjected to a left herniorrhaphy on 25 March. Routine pre-operative evaluation at that time included a roentgenogram of the chest that was interpreted as showing "infiltration, apparently fibrotic, in the right upper lobe; emphysematous changes in both bases; and probable cardiac enlargement." Following discharge on 6 April, the patient experienced increase in frequency and severity of chills. He was rehospitalized on 12 April because of additional complaints of "fatty intolerance" and dark-colored urine. The presumptive diagnosis was infectious hepatitis. Physical examination at that time revealed a blood pressure of 105/75 mm of Hg. Positive findings were cyanosis of the lips, venous distention, wheezing throughout both lung

fields, and hepatomegaly. Cardiac enlargement was present; heart tones were described as distant, but no friction rubs or murmurs were heard. Venous pressure was 240 mm of water. An electrocardiogram revealed changes compatible with pericarditis. The sedimentation rate was 4 mm/hour. A chest roentgenogram and fluoroscopic examination showed generalized cardiac enlargement and what was interpreted as "pericardial calcification" (figs. 1 and 2).

Digitalization was effected, and the patient improved clinically and symptomatically under a regimen of salt restriction and maintenance doses of digoxin (0.5 mg daily). First and second strength tuberculin skin tests were negative. He was transferred to this hospital on 28 May 1955.

The past and family histories were noncontributory.

Physical examination on admission revealed the following significant findings: cyanosis of lips; lung fields clear to auscultation; prominent venous distention in neck and arms. Blood pressure was 105/85 mm Hg. There was no clinical evidence of cardiac enlargement. A third heart sound was present at the apex, but no murmurs, thrills, or friction rubs were present. The liver edge was palpable 6 cm below the right costal margin. Although the hands and feet were cold to the touch, there was no evidence of peripheral edema.

Laboratory findings were as follows: Cardiolipin flocculation test and a routine urinalysis were normal. The hemoglobin was 12.6 g/100 ml; white blood cell count, 8,350/ μl, with a normal differential. Hematocrit was 43/100 ml; sedimentation rate, 3 mm/hour (corrected). Tuberculin, histoplasmin, and coccidioidin skin tests were negative. C-reactive protein test was negative. Liver function studies were normal with the exception of a sulfobromophthalein sodium retention of 31.25 per cent and a total van den Bergh of 1.84 mg/ml. An electrocardiogram showed inverted T waves in leads V_{2-6}. On a roentgenogram of the chest the cardiac silhouette was "bottle-shaped," and there was some widening of the upper mediastinum. Pericardial calcification was present, measuring 2 mm in thickness.

Venous pressure immediately before operation measured 360 mm of water and circulation time was 37.0 seconds (arm to tongue). Streptomycin sulfate was begun prophylactically, and on 10 June 1955 partial pericardiectomy and epicardiectomy were performed. Under endotracheal anesthesia, both sides of the chest were opened by a transverse anterior incision through the 4th interspaces. The sternum was divided in a step-like fashion and the pericardium and heart exposed. No pulsations were visible. Upon incision of the pericardium, a yellow-brown fluid exuded. The epicardium was found to be calcified. This was dissected anteriorly over the right side, eventually exposing a small portion of the auricle. The right ventricle was completely freed, as was the left ventricle except for one part where it was believed that pulsations were adequate. Freeing of the diaphragmatic surface was also

Figure 2. Pre-operative right anterior oblique view.

Figure 1. Pre-operative posteroanterior roentgenogram.

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accomplished. After removal of the epicardium, the pericardium was excised almost completely except for the most posterior portions.

Postoperatively, chest pain was relieved by intercostal block, and atelectasis prevented by breathing exercises and intermittent positive pressure oxygen. On 18 June 1955, venous pressure had fallen to 170 mm of water and peripheral venous distention had decreased markedly. The patient was progressively ambulated and digitalis discontinued on 27 June. Since then, he has been completely ambulatory and asymptomatic. During a 30-day convalescent leave, he led a perfectly normal existence without difficulty. Venous pressure on 10 August was 116 mm of water; circulation time 12.0 seconds (arm to tongue).

Three gastric cultures for acid-fast bacilli were negative. Eight cultures and six direct smears of material obtained at time of pericardial incision, as well as pericardium itself, were negative for acid-fast bacilli and pathogenic fungi. However, smears and cultures of pericardial fluid and resected tissue were positive only for *Micrococcus pyogenes* var. *aureus* (coagulase positive). Serial determinations of sulfobromophthalein sodium retention postoperatively have revealed a progressive fall to 6.5 per cent on 16 August 1955.

Comment: This patient conformed to the usual experience in that the onset of his infection was ill-defined but could probably be assumed to have had its beginning shortly before the appearance of his symptoms in January 1955. Historically, there was no evidence of an acute systemic infection, pneumonia, or rheumatic fever. Negative skin tests and bacteriologic studies served to rule out tuberculosis as a causative factor in this case; positive cultures for *M. pyogenes* var. *aureus* incriminated this organism as the causative agent.

SUMMARY

Pericardial constriction and calcification due to *M. pyogenes* var. *aureus* infection was demonstrated in a young man three months after the onset of symptoms. Some causative, physiologic, and surgical aspects of constrictive pericarditis have been reviewed.

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Pontocaine Poisoning

Report of Two Cases

PETER K. KOTTMEIER, *M. D.*
HOWARD C. LEIFHEIT, *Captain, MSC, USA*

ALTHOUGH both pontocaine (brand of tetracaine hydrochloride) and procaine hydrochloride are used as local infiltration anesthetics, procaine predominates in such a role. Pontocaine, on the other hand, finds its main use as a topical anesthetic. The present report concerns two cases of pudendal block anesthesia wherein pontocaine was mistaken for procaine and was used in the concentration and amount generally used for the latter, with toxic results.

Although both compounds are somewhat similar in chemical structure and in some physical and chemical properties, their toxicity differs greatly. One hundred and fifty milliliters of procaine hydrochloride and 20 ml of pontocaine hydrochloride as 1 per cent solutions are the comparable maximum dosages for injection. It can be generally stated that pontocaine is approximately 10 times more toxic than an equal amount of procaine when used parenterally.[1]

Both compounds are marketed under a wide variety of trade names, some of which are superficially similar in sound and spelling. This may well be the cause for instances of mistaken identity. Following are the chemical names and several trade names for each.

Generic Names

Tetracaine hydrochloride	Procaine hydrochloride

Chemical Names

n-butylaminobenzoyl-beta-dimethylaminoethanol hydrochloride	para-aminobenzoyl-diethylaminoethanol hydrochloride

Trade Names

Pontocaine	Novocaine
Pantocaine	Neocaine
Amethocaine	Ethocaine
Decicaine	Syncaine
	Kerocaine

From Landstuhl Army Medical Center, APO 180, New York, N. Y. Dr. Kottmeier is now at Baptist Memorial Hospital, San Antonio, Tex., and Capt. Leifheit is at Valley Forge Army Hospital, Phoenixville, Pa.

Because of the similarity between the names, it would be preferable to use the generic term "tetracaine" instead of the generally used trade name "pontocaine."

The following case reports demonstrate the results of overdosage of tetracaine mistakenly used for peripheral nerve block anesthesia.

CASE REPORTS

Case 1. A 28-year-old white woman, para 0, gravida 1, was first seen in the prenatal clinic during her third month of pregnancy. Examination at that time revealed a normal pregnancy. Routine prenatal examinations were continued until hospitalization. Her weight gain was 26 pounds. The patient offered no complaints. Physical and laboratory examinations were all within normal limits.

The patient was hospitalized eight days after her estimated date of confinement following spontaneous rupture of the membranes and loss of amniotic fluid. Prophylactically, 180 mg (300,000 units) of penicillin was administered daily. Labor began three days after admission. Due to an occiput posterior position the progress of the first stage was slow. Medication consisted of scopolamine and morphine.

The first stage lasted 27 hours. Spontaneously the occiput had rotated to the left transverse position when the head descended to 0.5 cm short of the perineum. The patient was removed to the delivery room. After routine perineal preparations, a pudendal nerve block was performed, using 40 to 50 ml of solution from a bottle labeled "1 per cent procaine hydrochloride." Within two minutes generalized convulsions and coma developed. Sixteen milligrams of morphine was slowly given intravenously until convulsions ceased. (Sixteen milligrams of morphine and 0.4 mg of scopolamine had been administered seven and three-quarters hours previously; 10 mg of morphine and 0.3 mg of scopolamine three and three-quarters hours previously.) Shortly after the convulsions ceased, respirations also slowed and disappeared. A bronchoscope was passed to administer endotracheal oxygen under positive pressure. Heart sounds could not be heard. Forty-five minutes after the patient entered the delivery room, postmortem cesarean section was performed with the delivery of a pale, seven-pound one-ounce male infant from which only an occasional heart beat could be heard. It was pronounced dead.

Pathologic findings. At autopsy, the lungs collapsed when the thorax was opened. Bilateral hydrothorax, 300 ml on the right and 400 ml on the left, and a hydropericardium of 300 ml were encountered. Pulmonary edema and intra-alveolar hemorrhage were present. Visceral congestion was noted.

The autopsy on the infant revealed only an auricular septal defect measuring 0.7 cm in diameter, and lack of aeration of the lungs.

Toxicologic findings. A flask labeled "1 per cent procaine hydrochloride" and containing the solution from which the injected material was

drawn was received for analysis. The melting range of crystals obtained from this solution was 145°-148°C. The range for tetracaine hydrochloride is 147°-150°C, and for procaine hydrochloride, 153°-156°C. This simple determination seemed to indicate the presence of tetracaine hydrochloride rather than procaine hydrochloride. The crystalline thiocyanate derivative was readily obtained from the unknown solution. This derivative, when purified and dried, melted at 131°-136°C, which compares with that of 130°-132°C for the same derivative of a pure tetracaine hydrochloride control. Such a derivative is not obtained from procaine. The beta-naphthol red precipitate test, which is positive for procaine, was negative for the solution used. Assay of the unknown solution, thus identified as tetracaine hydrochloride instead of procaine hydrochloride, revealed a concentration of 1 per cent.[2,3]

Case 2. This patient immediately followed the first patient into the delivery room. The solution used for pudendal block was not from the same bottle, but from the same lot prepared as "1 per cent procaine hydrochloride."

This primagravida with an uncomplicated prenatal history was given a pudendal block at the time of delivery. Within two minutes clonic contractions of the muscles of the extremities, head, and neck appeared. Coma rapidly ensued. Intravenous drip of 0.4 per cent pentothal sodium (brand of thiopental sodium) was immediately started and continued until the patient reached third-stage surgical anesthesia. Labor ceased. Because fetal heart tones remained steady at a normal rate, the fetus was allowed to remain with the head on the perineum. Several attempts were made at 20-minute intervals to lighten the anesthesia. Each time, peripheral muscular contractions recurred. When at the end of approximately two and one-half hours they no longer occurred, the pentothal sodium infusion was discontinued. The patient awoke within two to three hours. Locally, the vulva and perineum had become tremendously endematous, black, and cold. An hour later uterine contractions resumed. A term fetus which breathed and cried spontaneously was delivered. The episiotomy, necessitated by the large amount of perineal edema, did not bleed due to thrombosis of all vessels observed in the incisional wound. The wound healed by secondary intention during the next three weeks. The mother and baby were discharged at the end of the first week of hospitalization. Two months later, both were in excellent condition.

DISCUSSION

The clinical histories of these two patients seem to indicate that equal amounts of the same solution had been used in both cases. Toxic symptoms after injection were similar, although not to as great a degree in the second patient. The death of the first patient occurred within a short time, thus preventing the development of significant local symptoms. The second patient, however, had marked changes consisting of thrombosis of vessels, edema, and external cyanosis at the site of injection of the tetracaine solution.

Because information is lacking as to the exact volume of 1 per cent solution injected in the second patient, no definite explanation can be offered for the difference in outcome in the two patients. Survival of the second patient could be due to a difference in individual response to the same quantity of tetracaine, to the use of a smaller quantity of the drug, or to the effectiveness of therapeutic measures employed to control the ensuing convulsions. Both cases demonstrate the extreme toxic effect of tetracaine when used parenterally in dosages equal to that of procaine.

SUMMARY

A 1 per cent solution of tetracaine hydrochloride ("pontocaine") was unknowingly administered in place of procaine hydrochloride for pudendal block anesthesia to two patients, resulting in tetracaine poisoning.

Both patients reacted to the toxic effects of tetracaine with generalized convulsions, coma, and local edema (and thrombosis of vessels in case 2) at the infiltration site. The results were fatal to the mother and child in one case, but both survived in the second.

The laboratory methods described herein established the composition of samples of the solution injected as being 1 per cent tetracaine hydrochloride.

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ADDENDUM

After a case report entitled "Congenital Toxoplasmosis" appeared on pages 278 to 284 of the February 1956 issue of the *Journal*, a qualified investigator pointed out that no mention was made of serologic confirmation of the diagnosis. He suggested further, that the final sentence of the Summary should have ended as follows: ". . . offer the most satisfactory *clinical clues for suspecting the diagnosis, but confirmation is dependent on positive serologic tests.*"

Our readers will be interested to know that after the article had gone to press the author received a report of previously requested toxoplasma dye tests from Dr. Leon Jacobs of the National Institute of Allergy and Infectious Diseases, indicating a positive serum test in a dilution of 1 to 16,384. Tests made elsewhere had shown the mother's serum to be positive in a dilution of 1 to 1,024.

A MESSAGE FROM THE A. M. A.

If you are trying to figure out where you are going to set up a private practice should you leave the military service—if you want information on establishing an office or clinic or a medical facility—if you have a question concerning voluntary health insurance—if you are interested in community health facilities—if you want to know about national, state, or county programs in regard to indigent care, maternal and child care, or activities of state and county medical societies—in fact, if you are interested in almost any phase of the broad subject of medical service, the Council on Medical Service of the American Medical Association can help you.

The Council on Medical Service was established in 1943 by the House of Delegates to study the effect of social and economic changes on the practice of medicine and to report these changes to the profession. It is one of the four standing committees of the House of Delegates.

The Council has eight special committees functioning in the following fields of medical service: (1) Medical and Related Facilities, (2) Indigent Care, (3) Maternal and Child Care, (4) Medical Care for Industrial Workers, (5) Federal Medical Services, (6) Prepayment Medical and Hospital Services, (7) Relations with Lay-Sponsored Voluntary Health Plans, and (8) Geriatrics.

The two committees whose activities affect a serviceman most specifically and are of the most interest to military medical officers are the Committee on Federal Medical Services and the Committee on Medical and Related Facilities. The former deals with many questions having to do with physicians in service and frequently works in close contact with the Council on National Defense on such subjects as medical care for dependents of military personnel, use of civilian medical facilities by the Armed Forces, and veterans medical care problems.

The Committee on Medical and Related Facilities directs the operation of the American Medical Association's Physicians Placement Service. The twofold purpose of this service is: (1) to disseminate location information to physicians seeking an opportunity for practice—interns, residents, those considering relocating, and those being discharged from the Armed Forces;

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor.*

and (2) to aid those requesting assistance in securing a physician, such as communities, physicians seeking an associate, and expanding group practices. A similar service is offered under the auspices of many state medical societies.

When the Council on National Defense is notified that a physician is being released from active military duty, the facilities of the Physicians Placement Service are offered him free of charge. If the physician wishes to utilize such assistance, he returns a card sent to him by the Council on National Defense. In turn, a questionnaire is completed by the physician and returned to the Physicians Placement Service. Based upon his reply, any location information that corresponds to the description of the opportunity he is seeking is forwarded to him. In addition, a copy of his questionnaire is referred for additional information to the placement services of the state medical associations in which he has indicated an interest in practicing. The greatest number of listings available are for general practitioners in small communities. Other listings include medical opportunities in industry, the Veterans Administration, Public Health, institutions, general practice association, and some specialties. The booklet, "Physicians Placement Service—1955," offers a more detailed description of the activities of both the national and state offices in this field. A copy of this publication may be obtained by writing to the Council on Medical Service, American Medical Association, 535 N. Dearborn St., Chicago 10, Ill.

A second available publication of potential value to the physician about to return to civilian life is the 85-page brochure, "A Planning Guide for Establishing Medical Practice Units." This booklet, which was edited by the American Medical Association and published through a grant made by the Sears-Roebuck Foundation, offers practical suggestions on the various levels of planning a practice unit—buying, building, remodeling, and even arranging of furnishings. Another feature included in this booklet is information on the business side of a medical practice.

A third booklet, the "Sears-Roebuck Foundation Plan of Assistance to Physicians Establishing Medical Practice Units," offers an explanation of the purpose and the administration of a revolving assistance fund available to qualified physicians in the establishment of medical practice units. Included in the booklet is an application form along with the addresses of the members of the Medical Advisory Board of the Sears-Roebuck Foundation. Applications are directed to members of this Board.

These and a list of more than 30 publications in the field of medical service are likewise available from the Council on Medical Service upon request.

All physician members, military and nonmilitary, should know more about the varied activities and services offered by the American Medical Association. A better understanding and maximum benefit will result for everyone concerned. This series of articles devoted to the functions and activities of the Association will be continued in the next issue of this *Journal*.

FOUNDATION TO CONTINUE PRACTICE GRANTS IN 1956

Armed Forces physicians about to return to civilian life may find the Sears-Roebuck Foundation's plan of financial assistance helpful to them in setting up practices, according to an announcement from the American Medical Association. The Foundation grants long-term unsecured loans to doctors to enable them to complete the financing of their practices. The loans are granted only when the physicians have utilized all conventional loan facilities and serve to make up the difference between conventional financing and completed cost. They are repayable within 10 years with monthly installments starting not later than the beginning of the fourth year.

The plan is administered by the Foundation, while the screening and selection of applicants is done by a 17-member advisory board of leading physicians named by the trustees of the American Medical Association. Loans, ranging from $3,000 to $25,000, last year went to 18 doctors setting up 10 practices in eight states. The units fall into two categories: those which bring medical care and facilities to communities where none exist, and those which retain existing care and facilities in areas about to lose them.

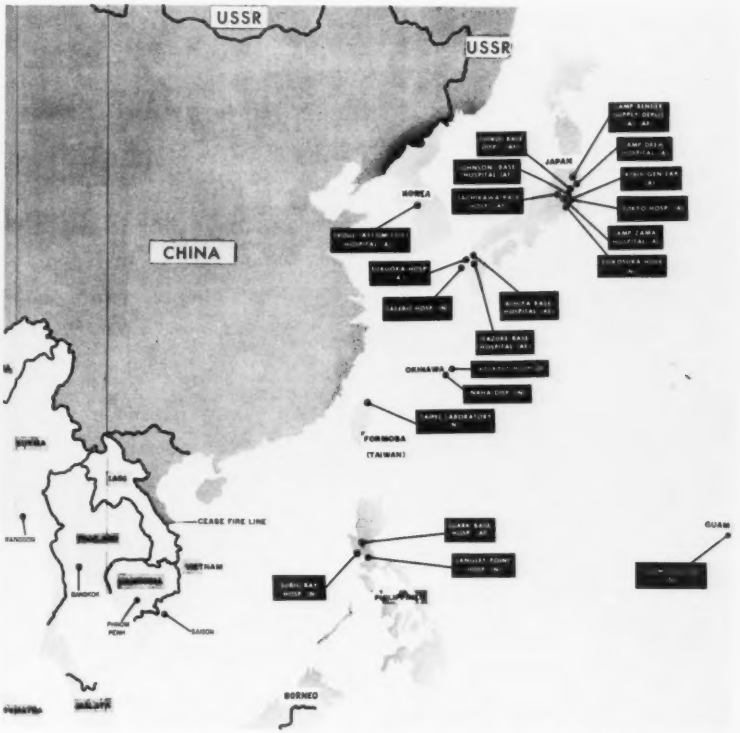
PROBLEMS OF FAR EASTERN FACILITIES STUDIED BY HIGH MEDICAL OFFICIALS

Conference at Far East Naval Headquarters, Yokosuka. Vice Admiral William M. Callaghan, USN, Commander U. S. Naval Forces Far East, discusses medical problems in the area with Doctor Edward H. Cushing, Deputy Assistant Secretary of Defense (Health and Medical), and Rear Admiral Irwin L. V. Norman, MC, USN, Assistant Chief for Personnel and Professional Operations, Bureau of Medicine and Surgery.

Dr. E. H. Cushing, Deputy Assistant Secretary of Defense (Health and Medical), and Rear Admiral I. L. V. Norman, MC, USN, Assistant Chief of the Bureau of Medicine and Surgery for Personnel and Professional Operations, made an extended tour of military medical facilities in the Far East during January and early February. These senior officials took time off from their important duties in Washington in order to observe present conditions in the Far East and to discuss with medical and dental personnel stationed in the many areas visited, both the programs now in operation and projects that are currently under consideration.

The itinerary included all major medical installations in Japan, Korea, Okinawa, the Philippine Islands, Guam, Kwajalein, and Honolulu. In Taiwan, Saigon, Bangkok, Phnom Penh, and Rangoon, the Military Assistance Advisory Groups were visited and the medical prob-

lems in connection with these Groups were discussed. Included in the discussion at each activity visited were the pertinent dental problems and how they were being met. Much interest was evinced in the recommendations of the Career Incentive Task Group, the proposed Dependents' Care Bill, and the proposed Survivors' Benefit Bill.



Black circles pinpoint the many medical installations and Military Assistance Advisory Groups visited.

Major General E. Standlee, MC, Surgeon, U. S. Army Forces, Far East; Brigadier General O. K. Niess, USAF (MC), Surgeon, Far East Air Forces; and Captain C. W. Stelle, MC, USN, Staff Medical Officer, Commander U. S. Naval Forces Far East, accompanied Doctor Cushing and Admiral Norman during their visits to each of the above command areas.

A conference was held with Admiral Felix Stump, USN, Commander in Chief, U. S. Pacific Fleet, on the return through Hawaii, in which the medical problems encountered in the Far East were discussed.

Doctor Cushing was impressed by the excellent medical and dental support given by each of the services throughout this extensive area.

Promotions of Officers

The following officers on active duty in the Navy have recently received temporary promotions to the rank indicated.

MEDICAL CORPS

AIMAR, Charles E., Lt.
ALBRITTAIN, John W., Capt.
ALMAN, Ralph W., Lt. Comdr.
ALVIS, Harry J., Capt.
ANDERS, Patrick L., Lt.
ANDERSON, Rubert L., Capt.
ANDERSON, Thomas A., Lt. Comdr.
ARLEN, Harold W., Lt.
AULWURM, Richard H., Lt.
AYRES, William W., Capt.
BAKER, William S., Jr., Capt.
BAREFIELD, Alwin S., Lt. Comdr.
BARGER, John B., Capt.
BASILICATO, Gennaro, Capt.
BATTEN, Woodrow, Lt. Comdr.
BAXTER, Harold L., Capt.
BELL, George M., Capt.
BISHARAT, Emile H., Lt. Comdr.
BLACK, Ross P., Capt.
BOYD, Winton R., Lt. Comdr.
BRANCAZIO, Dominic A., Lt.
BRANNON, Leland C., Lt. Comdr.
BRINGARDNER, Albert M., Lt.
BRITTEN, Sidney A., Capt.
BROADDUS, Carl A., Jr., Lt. Comdr.
BROCK, Bernard, Jr., Lt.
BROWN, Herbert R., Jr., Lt.
BUNCH, Charles, Capt.
BURDON, John C., Lt. Comdr.
BURNS, Benjamin F., Lt. Comdr.
BYRD, Jack E., Lt. Comdr.
CANNON, Henry T., Capt.
CAPPELLETTI, Ado J., Lt. Comdr.
CASTLE, Charles A., Capt.
CHAFFIN, Alexander N., Capt.
CHAMPION, William J., Lt. Comdr.
CLARK, Benjamin W., Capt.
CLARK, Frederick A., Jr., Lt. Comdr.
CLARK, Samuel, Lt. Comdr.
CLAVE, Ralph A., Lt. Comdr.
CLOHESSY, Curtice E., Lt.
CODD, Richard L., Lt.
COHNSTEIN, Leonard, Lt.
COLANTUONO, Julius G., Lt. Comdr.
COLEMAN, James T., Lt.
CONE, Thomas E., Jr., Capt.
COOK, John L., Lt.
COPPOLETTA, Joseph M., Capt.
COWAN, John S., Capt.
CRAFT, Theophalus G., Lt. Comdr.
CUNNINGHAM, Lowell K., Lt. Comdr.
CURTISS, Frederick M., Lt. Comdr.
CURTS, Calvin J., Lt. Comdr.
CUTTLE, Tracy D., Capt.
DAVIS, Clement E., Lt. Comdr.
DAVIS, Frederick J., Lt. Comdr.
DAVIS, George M., Jr., Capt.
DEEN, Robert R., Capt.
DEMO, Percy W., Capt.
DETARNOWSKY, G. O., Capt.
DICKENS, Paul F., Jr., Capt.
DOBSON, John P., Capt.
DONABEDIAN, George, Capt.
DOOHEN, Donald J., Lt. Comdr.
DOUDNA, Calvin T., Capt.
DRISKELL, Melville M., Capt.
DRUCKEMILLER, William H., Capt.
EBERLY, Byron T., Lt. Comdr.
ECKER, Herbert A., Lt. Comdr.
EDWARDS, Donald W., Lt. Comdr.
ENSON, Yale, Lt.
ERDBRINK, Wayne L., Lt. Comdr.
ERICSSON, Bernard R., Lt. Comdr.
ETTER, Harry S., Capt.
EYER, Simon W., Capt.
FEDER, John C., Capt.
FIROR, Hugh V., Lt.
FLYNN, John W., Lt. Comdr.
FOX, Samuel M., III, Lt. Comdr.
FRANK, Martin J., Lt.
FREYLING, Robert A., Capt.
FRIEND, Leroy F., Capt.
FUELLING, James L., Capt.
GARD, Perry W., Capt.
GEISE, Ralph W., Capt.
GENS, Louis R., Capt.
GERISCH, Robert A., Lt. Comdr.
GEUTING, Bernard G., Capt.
GIBBS, Albert G., Capt.
GIOTTA, Peter J., Capt.
GLECKLER, William J., Lt. Comdr.
GLEYSTEEN, Rodney R., Capt.
GODINEZ, Marcos A., Capt.
GOLDTHWAITE, Dana D., Capt.
GOODMAN, Rexel, Capt.
GORMAN, John E., Capt.
GORTON, Samuel H., Lt. Comdr.
GREEN, Paul S., Lt. Comdr.
GRIGGS, James Y., Lt. Comdr.
GRIMES, Hubert N., Lt.
GUITTNER, Howard, Lt. Comdr.
GULLETT, William E., Jr., Lt. Comdr.
GUSTIN, Jasper W., Jr., Capt.
HAGEN, Werner J., Lt.
HALL, Vinton, Capt.
HARRIS, Arthur D., Lt. Comdr.
HEATON, Samuel A., Jr., Lt. Comdr.
HEDBLOM, Earland E., Capt.
HELFRICH, Norma A., Jr., Lt.
HELLER, Philip H., Lt. Comdr.
HENDERSON, Frederick C., Lt.
HIGHTOWER, David P., Capt.
HILL, Robert L., Lt. Comdr.
HO, Kenneth E., Lt. Comdr.
HOFFMAN, Harry L., Lt. Comdr.
HOFFMAN, Theodore E., Capt.
HOFFMANN, Ronald E., Lt.
HOPPER, Edward B., Capt.
HUBBARD, Hampton, Lt. Comdr.
HUGAN, Clarence C., Jr., Lt.
HUNLEY, Henry C., Jr., Capt.
HUNTER, Henry J., Capt.
HURLBURT, Edward G., Capt.
HURST, Gerald W., Capt.
INHORN, Stanley L., Lt.
JAMES, Roger A., Capt.
JARCHOW, Brian H., Lt.
JARRETT, Thirl E., Capt.
JARUSZEWSKI, Edward J., Capt.
JEFFERS, Clark P., Capt.
JENKINS, John R., Jr., Lt. Comdr.
JOFFE, Seymour, Lt.

JOHNSON, Broor A., Capt.
JOHNSON, Elmer B., Capt.
JOHNSTON, Graham R., Capt.
JOHNSTON, Sidney F., Capt.
JONES, Horace L., Jr., Capt.
JORDAN, Joseph M., Capt.
JOY, Ernest H., Capt.
JULIEN, Edward E., Lt. Comdr.
KAESS, Karl V., Capt.
KAPLAN, Solomon A., Lt. Comdr.
KEETON, Elvin E., Capt.
KEITH, Joseph, Jr., Lt.
KELLEY, Charles W., Lt.
KELLY, Arthur L., Capt.
KEMP, Simon I., Capt.
KENT, Howard R., Lt. Comdr.
KINGSTON, James R., Capt.
KOHUT, George J., Capt.
KROLL, Peter G., Capt.
KUCERA, Wallace K., Lt.
KURFEES, James G., Capt.
LAUTZENHEISER, Roscoe B., Capt.
LENHARDT, Harry F., Capt.
LEVINE, Robert I., Lt.
LEVITT, Earl, Lt. Comdr.
LIEBERMAN, Nathan, Capt.
LILLIE, Morton L., Capt.
LIPCON, Harry H., Capt.
LOMBARDO, Francis A., Lt.
LONGENECKER, Charles R., Capt.
LOVEJOY, Ferold D., Capt.
LYMAN, Frank L., Lt. Comdr.
LYONS, William F., Capt.
MACAULAY, Francis X., Lt. Comdr.
MACKINNON, Donald G., Capt.
MACKOSKE, William F., Capt.
MAINES, John G., Jr., Lt. Comdr.
MANLEY, Thomas M., Capt.
MARCY, Deane S., Capt.
MARGILETH, Andrew M., Lt. Comdr.
MARKOWITZ, Herbert A., Capt.
MARKS, Thomas S., Lt. Comdr.
MARTIN, John P., Capt.
MASENHIMER, Harold W., Jr., Lt.
MASON, Malcolm W., Capt.
MATTISON, William L., Capt.
McCAULEY, Henry L., Jr., Lt.
McCAY, Thomas S., Lt.
McCLENATHAN, James E., Lt. Comdr.
McCOY, John T., Lt. Comdr.
McDONOUGH, Oscar T., Jr., Capt.
McKEAGUE, David H., Capt.
MEADOR, George E., Capt.
MIGHT, James E., Lt.
MILLAR, Jack W., Lt. Comdr.
MILLS, Stephen R., Jr., Lt. Comdr.
MITCHEL, Robert E., Lt. Comdr.
MITCHELL, Augustus W., Lt. Comdr.
MONTGOMERY, Duncan C., Lt. Comdr.
MOORE, Paul T., Capt.
MORAN, James P., Capt.
MORGAN, Rees, Capt.
MORRIS, Mason, Jr., Capt.
MOST, John A., Lt.
MOUNT, Robert A., Capt.
MURPHY, James A., Capt.
MURRAY, William E., Lt.
MYERS, John L., Lt.
NAHASS, Elias N., Lt. Comdr.
NELSON, Norman M., Lt. Comdr.
NIFOROPULOS, James A., Capt.
NORRIS, Frank T., Capt.
OLECHOWSKI, Leo W., Capt.
OLSON, Nelse C., Capt.
PALERMITI, Leon F., Lt. Comdr.
PARK, Casimir F., Capt.
PARKER, Charles W., Lt.
PARMELEE, Kenneth A., Lt. Comdr.
PARTRIDGE, John W., Lt. Comdr.
PEAR, Edwin J., Lt.
PECKINPAUGH, Robert O., Lt. Comdr.
PHILLIPS, Robert A., Capt.
PIERCE, Wilmot F., Capt.
PINDERHUGHES, John L., Lt. Comdr.
PINKHAM, Edward W., Jr., Capt.
PLUKAS, Joseph M., Jr., Lt.
POLLARD, Joseph P., Capt.
POTTER, Maxwell G., Lt. Comdr.
PRESCOTT, Johnson T., Lt.
PRESTON, Paul J., Lt. Comdr.
RAMOSGONZALES, Luis, Lt. Comdr.
RAY, Robert C., Capt.
REITZ, Harvey E., Capt.
RICHARDSON, Hersch F., Capt.
ROBBINS, Howard M., Capt.
ROBERTS, Harry L., Jr., Lt. Comdr.
ROBERTS, William L., Capt.
ROSENFELD, David D., Lt. Comdr.
ROTHMAN, Stanley D., Lt. Comdr.
RUBINOWITZ, Julius A., Lt. Comdr.
RUPRECHT, Archibal L., Lt. Comdr.
RUSH, Cyril B., Lt.
SACHER, Edward C., Lt.
SALAZARRODRIGUEZ, Joseph, Lt. Comdr.
SANBORN, Neal D., Lt. Comdr.
SANDERS, Russell F., Capt.
SANGER, George M., Lt. Comdr.
SCHENCK, Kenneth W., Capt.
SCHIFF, George N., Capt.
SCHMID, William A., Capt.
SCHULTZ, Arthur L., Capt.
SCHWENKE, Quentin G. R., Lt.
SCOTT, Kenneth S., Capt.
SHIPLEY, Richard E., Lt. Comdr.
SIESS, Eugene E., Capt.
SINGER, Paul J., Lt. Comdr.
SLONIM, Nathaniel B., Lt. Comdr.
SMALLEY, Paul E., Lt.
SMEDAL, Harold A., Capt.
SMITH, Charles H. C., Capt.
SMITH, John F., Capt.
SNEDDON, Ernest A., Lt. Comdr.
SNODGRASS, Philip J., Lt.
SNOWDEN, William M., Capt.
SNYDER, Marvin C. G., Lt.
SOULE, Francis G., Jr., Capt.
SPICER, Donald W., Lt. Comdr.
STANDARD, Roger A., Capt.
STARK, James E., Lt. Comdr.
STEEL, Robert M., Lt. Comdr.
STEVENSON, Clifford A., Capt.
STEWART, James H., Lt. Comdr.
STEWART, Lee W., Lt. Comdr.
STONE, Evan C., Jr., Capt.
STRATTON, Victor C., Capt.
STREETER, Ralph G., Capt.
STREIT, Harold A., Capt.
STRUBBE, James M., Lt. Comdr.
STUBENBORD, John G., III, Capt.
SUITOR, Jesse H., Capt.
TANDY, Roy W., Sr., Capt.
TAYLOR, Edward H., Capt.
TAYLOR, Walter R., Capt.
THATCHER, Joseph C. M., Capt.
THOMAS, Edward L. C., Capt.
THOMAS, Edward P., Lt. Comdr.
THOMAS, George F., Lt.
TRAUGH, John C., Capt.
TREIBER, Martin W., Lt.
VILAROGRAU, Juan P., Lt.

VOLK, Ralph, Capt.
WAGNER, Milton E., Capt.
WAGNER, Robert L., Capt.
WAGNER, Vincent E., Capt.
WEAVER, Joseph W., Capt.
WEBER, Walter M., Capt.
WEIDEMANN, Karl C., Lt. Comdr.
WEILAND, Irvin H., Lt. Comdr.
WEITZ, Henry, Lt. Comdr.
WHATLEY, Joseph L., Lt. Comdr.
WHIPPLE, Robert J., Capt.
WIBLE Leroy E., Capt.
WILLIAMS, Richard B., Jr., Capt.
WILLIAMS, William R., Jr., Lt. Comdr.
WINTER, Fred S., Lt. Comdr.
WITWER, Russell G., Capt.
WOLFE, Henry E., Jr., Lt. Comdr.
WOODARD, William C., Lt.
WOOLSEY, Elwood L., Capt.
WORKMAN, Robert D., Lt. Comdr.
WORTHINGTON, R. W., Jr., Capt.
ZELDIS, Norman, Lt. Comdr.
ZINKE, Earnest A., Jr., Capt.

DENTAL CORPS

ABBOTT, David, Lt. Comdr.
ABEL, Lloyd F., Capt.
ANDERSON, Frank H., Lt.
ANDERSON, John T., Lt.
ANDERSON, Vernon L., Capt.
ANTON, Albert H., Lt.
ARDOIN, Wilson A., Lt. Comdr.
ARTHUR, John F., Capt.
ATKINS, John H., Capt.
AWNER, Bert, Lt.
BANCROFT, John A., Jr., Lt. Comdr.
BARNES, Forrest A., Capt.
BATCHELDER, Richard M., Lt. Comdr.
BAYLES, Marvin A., Lt.
BERCIER, Charles H., Capt.
BERRUETA, Joseph J., Jr., Lt.
BIEDERMANN, John L., Capt.
BLACKWELL, Richard T., Lt. Comdr.
BLAND, George A., Jr., Lt.
BOHAKER, Lloyd A., Capt.
BONNETTE, Gerald H., Capt.
BOOTH, John O., Capt.
BOWMAN, John F., Capt.
BRANDENBURG, Charles L., Jr., Lt.
BRANDT, Max J., Capt.
BRANDT, Paul L., Capt.
BRAUER, Frank J., Lt. Comdr.
BREEDING, William R., Lt.
BRIDGE, Kenneth K., Capt.
BRIGGS, Donald R., Lt.
BROWN, David T., Lt.
BROWN, Frederick S., Jr., Capt.
BROWN, Milton H., Capt.
CALHOUN, Richard D., Capt.
CANAL, Philip A., Capt.
CARLSON, Donald E., Capt.
CARRAWAY, George F., Lt. Comdr.
CARSON, Earl M., Lt.
CHESTERFIELD, Wallace B., Capt.
CHUBB, William E., Lt.
COBB, William J., Capt.
COLBY, Gage, Lt. Comdr.
COLLETT, Henry A., Jr., Capt.
COLLINS, James A., Lt.
COOKSEY, Donald E., Capt.
CORDONIER, Louis H., Lt. Comdr.
CORLEY, Clarence R., Jr., Lt.
COURAGE, Guy R., Lt. Comdr.
CRAWFORD, David C., Lt.
CRAWFORD, Donald G., Lt.
DANN, Walter W., Capt.
DEATON, Herbert C., Lt.
DEFIEBRE, Bruce K., Capt.
DELGAUDIO, Constant P., Lt. Comdr.
DEMER, Walter J., Capt.
DENNY, George M., Capt.
DENTON, James R., Lt.
DESHAZO, George S., Capt.
DIZINNO, Vincent A., Lt.
DONNELLY, James P., Capt.
DONOVAN, Delbert L., Lt.
DOSS, Leslie W., Jr., Lt.
DOWNERY, William E., Jr., Lt
DWINCENT, Richard C., Lt. Comdr.
EASTMAN, Arthur D., Capt.
EDWARDS, Boyd C., Lt.
EISENBERG, Richard, Lt. Comdr.
ELLENBERGER, William, Capt.
ELMQUEST, Carl W., Lt. Comdr.
ERDMAN, Robert F., Capt.
ETTER, Frank K., Capt.
FABRICK, Ronald W., Lt.
FALTERMAYER, Joseph E., Capt.
FERGUSON, Bart F., Lt.
FERGUSON, George W., Capt.
FIRESTONE, Dale L., Lt. Comdr.
FISCHER, Howard H., Capt.
FITZPATRICK, Joseph R., Lt.
FOGLIA, Carl R., Lt.
FOLEY, Allan C., Lt.
FOX, David M., Capt.
FRANKLIN, William R., Capt.
FRENCH, John H., Lt.
FRIZZELL, Edmund H., Capt.
FRYE, Charles S., Jr., Capt.
GAVER, Oren H., Jr., Lt. Comdr.
GERRY, Roger G., Capt.
GIAMMUSSO, Anthony P., Lt. Comdr.
GLASS, Theodore A., Lt.
GOBBEL, John T., Jr., Lt.
GOLDSMITH, Earl A., Capt.
GORDON, Robert C., Capt.
GRANDICH, Russell A., Lt.
GRANT, Angus W., Capt.
GRECO, Raymond F., Lt.
GREEN, Harold G., Capt.
GROSSMAN, Frank D., Lt. Comdr.
HAGERMAN, Wade H., Jr., Lt. Comdr.
HAISCH, Howard B., Capt.
HALL, Henry H., Capt.
HAMER, Ronald N., Lt.
HAMILTON, Baker M., Capt.
HANSEN, Louis S., Capt.
HARRIS, James E., Lt.
HARTWIG, Elmer F., Capt.
HARWOOD, Richard C., Capt.
HAWKINS, Richard H., Lt.
HAYNES, Ralph B., Capt.
HEARTWELL, Charles M., Jr., Capt.
HEMPHILL, Charles D., Capt.
HENDERSON, Davis, Capt.
HIATT, William R., Lt.
HICKS, Henry H., Lt. Comdr.
HODDER, Edwin J., Lt. Comdr.
HODSON, Harold W., Lt.
HOFFELD, Irving J., Lt. Comdr.
HOGAN, John A., Capt.
HOLMES, David H., Lt.
HOLMES, Samstone, Capt.
HOLT, William E., Lt.

HOLZER, John P., Lt.
HORN, Joseph R., Capt.
HOWELL, Sidney R., Capt.
HUMPHREYS, Kelt B., Jr., Lt.
HYDE, Jack E., Lt.
IKENBERRY, Esthel D. K., Lt. Comdr.
ISBELL, David M., Lt.
JACKSON, Venard R., Capt.
JARABAK, John P., Capt.
JOHNSON, Harvey S., Capt.
JOHNSON, Leonard E., Capt.
JOHNSON, Van L., Jr., Lt. Comdr.
KALUS, Frank J., Capt.
KELLY, Charles L., Lt.
KEMP, Wilson P., Capt.
KEY, William H., Capt.
KILL, Grover C., Jr., Lt.
KING, William D., Capt.
KNAPP, Victor P., Lt. Comdr.
KOLB, Robert A., Lt.
LADD, Charles J., Lt.
LAMOTHE, Daniel E., Capt.
LECLAIRE, George J., Capt.
LEISZ, Albert P., Capt.
LIESER, William H., Capt.
LILLY, Albert J., Capt.
LINDELOF, Robert D., Capt.
LINK, Joseph F., Capt.
LONGEWAY, Kenneth L., Capt.
LOVING, Robert H., Capt.
LUDWICK, William E., Capt.
LUND, Anthony L., Lt.
LYNDS, Charles W., Lt. Comdr.
MAKOVICH, Joseph J., Lt.
MANNING, Martin M., Lt.
MARTIN, Clyde L., Capt.
MAZZARELLA, Maurice A., Lt. Comdr.
McAFEE, Morgan F., Jr., Capt.
McALLER, Joseph W., Capt.
McCLELLAND, Richard L., Lt.
McEACHREN, John H., Capt.
McLENNAN, William A., Capt.
McMINN, William H., Lt.
MEAD, Meredith H., Capt.
MERRIAM, Kenmore E., Capt.
MESSINA, Richard J., Lt.
MEYERS, Charles E., Capt.
MILLARD, Robert C., Capt.
MILLER, Norman M., Lt.
MONES, Jerome, Lt. Comdr.
MONROE, William A., Jr., Lt. Comdr.
MOORE, William C., Jr., Lt.
MORGAN, Wade H., Jr., Capt.
MORTELL, Ward M., Capt.
MURPHY, Eastes W., Capt.
NAYLOR, Merlin E., Lt. Comdr.
NEALON, Eugene T., Capt.
NESKOW, Robert S., Lt. Comdr.
NEWMAN, William A., Capt.
NIELSEN, Arne G., Capt.
OHL, Richard W., Capt.
OSDOBA, David J., Lt.
OSTROM, Carl A., Capt.
OVERTON, Neil J., Capt.
PABLOS, Tomas C., Lt. Comdr.
PARR, George W., Capt.
PARROTT, John W., Lt.
PARRY, Donald E., Lt. Comdr.
PEBLEY, Harry C., Lt.
PENNELL, Ernest M., Jr., Lt.
PHILLIPS, James W., Lt.
PHILLIPS, Robert L., Capt.
PINKLEY, Virgil A., Lt.
PISTOTNIK, Anton V., Lt.
POLAYES, Irving M., Lt.
PRICHARD, Bailey W., Lt.
PURDUM, Ernest L., Capt.
RADER, George C., Capt.
RAPHAEL, Alfred L., Capt.
RAVIN, Peter P., Jr., Lt.
REYNOLDS, Edward C., Lt.
REYNOLDS, George R., Capt.
RICE, Clifford H., Capt.
RICE, John W., Capt.
RILEY, Harry S., Lt.
RINCK, Theodore J. H., Lt. Comdr.
RIVES, Robert G., Lt. Comdr.
ROBINSON, Jack W., Lt. Comdr.
ROBINSON, Ruben P., Lt.
ROBINSON, Vernon S., Capt.
ROCHE, Harry J., Capt.
RODENBARGER, Lynn H., Capt.
ROSS, Peter C., Lt. Comdr.
RUBIN, Judah L., Lt.
RULIFFSON, Franklin R., Lt.
SANDERS, William E., Capt.
SAZZIMA, Henry J., Lt.
SCHABEL, Russell W., Lt.
SCHINDLER, Robert D., Capt.
SCHMIDT, Juane A., Lt.
SMECKERT, Teddy J., Lt.
SMITH, Dean C., Lt.
SMITH, Henry C., Lt. Comdr.
SMITH, Howard C., Capt.
SNYDER, David E., Lt.
SONNEMAN, Robert E., Jr., Lt.
STAPLES, William R., Lt. Comdr.
STERN, Morton J., Lt.
STODOLA, Francis H., Capt.
SUITOR, Paul W., Capt.
SWAN, Walter D., Lt.
SYDOW, Paul J., Lt.
TANNER, Henry M., Lt. Comdr.
TERRY, Bill C., Lt.
TEUTSCH, Laren W., Lt. Comdr.
THIMES, Joseph A., Capt.
THOMAS, George K., Lt.
THOMAS, William M., Capt.
THOMASON, Robert R., Lt.
THOMPSON, Donald W., Capt.
THOMPSON, Walter A., Capt.
TRAEGER, Kimble A., Lt. Comdr.
TROXELL, Richard R., Lt. Comdr.
TURVILLE, Arthur S., Capt.
VANEE, William J., Capt.
VELINE, Carl A., Capt.
VENO, Clarence G., Capt.
VINCENT, Burnell W., Capt.
WAIS, Frank T., Capt.
WALLACE, Leslie M., Capt.
WALLENBORN, Ramond J., Capt.
WALSWORTH, Clyde H., Capt.
WELDEN, Robert B., Lt. Comdr.
WHEATCROFT, Merril G., Capt.
WIBLE, John R., Capt.
WIGAND, Frederick T., Capt.
WILLIAMS, Cline C., Capt.
WILLIAMS, Leonard E., Lt. Comdr.
WOHLFARTH, William C., Jr., Capt.
WOLCOTT, Robert E., Capt.
WOLCZEK, Alexander, Lt.
WOODLAND, Evera C., Jr., Lt.
YENDES, Albert F., Lt.
ZAPSKI, Edward G., Lt.
ZELEDON, Luis M., Lt. Comdr.
ZUSTIAK, Michael, Lt. Comdr.

DEATHS

GRIFFITH, John Walter, Lieutenant Colonel, DC, USAR, of Tacoma, Wash.; stationed at Madigan Army Hospital, Fort Lewis, Wash.; graduated in 1924 from the North Pacific College of Oregon School of Dentistry, Portland, Ore.; commissioned a First Lieutenant 19 June 1928, ordered to active duty 10 March 1942; died 30 November 1955, age 56, at Madigan Army Hospital, of pulmonary edema.

MITCHELL, Frank James, Commander, MSC, USN, of San Diego, Calif.; stationed at Armed Services Medical Procurement Agency, Brooklyn, N. Y.; entered the naval service in 1922; appointed a warrant pharmacist in 1938; died 29 January 1956, age 52, at the U. S. Naval Hospital, Great Lakes, Ill.; of glioma of the right cerebrum.

SMITH, Phillip Dudley, Lieutenant Colonel, MC, USAR, of Knoxville, Tenn.; stationed at U. S. Army Hospital, Fort Benning, Ga.; graduated in 1933 from the University of Tennessee College of Medicine, Memphis, Tenn.; died 14 December 1955, age 46, at Fort Benning Army Hospital, of anoxia.

STUEWER, Herbert Philip, Lieutenant Colonel, MSC, USAR, of Durand, Wis.; stationed at Headquarters Detachment, 56 Medical Battalion, Germany; commissioned a Second Lieutenant 30 November 1924; ordered to active duty 19 December 1940; died 12 December 1955, age 53, in Germany, of myocardial infarction.

WILSON, Clarence Benjamin, Captain, MC, USAR, of Bronx, N. Y.; stationed at Army Medical Service School, Fort Sam Houston, Tex.; graduated in 1951 from Howard University College of Medicine, Washington, D. C.; commissioned a Captain and ordered to active duty 29 December 1955; died 21 January 1956, age 35, in Nuevo Laredo, Mexico.

AMERICAN COLLEGE OF PHYSICIANS MEETS IN L. A.

The 37th annual session of the American College of Physicians will be held in Los Angeles, Calif., from April 16 to 20, 1956. In addition to the presentation of a large number of papers at the general sessions, there will be 6 clinical pathologic conferences, 16 panel discussions, 53 scientific and 100 technical exhibits, and 28 color-televised hospital "clinics." Organizational meetings include the annual business meeting, convocation, a concert, reception, banquet, and dance. Headquarters will be the Shrine Auditorium. A detailed program appears in the February 1956 issue of *Annals of Internal Medicine.*

Erratum: In the January 1956 issue (page 135) an error was made in the listing of Elmer V. Dahl, USAF (MC); he was promoted to the permanent grade of *Captain.* The *Journal* regrets this error.

Reviews of Recent Books

FRACTURES AND JOINT INJURIES, by Sir *Reginald Watson-Jones*, F. R. C. S., F. R. A. C. S. (Hon.), F. A. C. S. (Hon.), F. R. C. S. E. (Hon.), M. Ch. Orth., M. B., Ch. B., M. R. C. S., L. R. C. P. Volume II. 4th edition. 1,073 pages; illustrated. Williams and Wilkins Co., Baltimore, Md., 1955. Price $22.

In revising the third edition, the author has considered the newer concepts that have been advocated in the diagnosis and treatment of trauma to the musculoskeletal system. Certain of these concepts, such as the use of intramedullary nails in the treatment of femoral shaft fractures and of prosthetic heads in femoral neck fractures, are endorsed with reservations. Exceptions are taken to other concepts such as excision of the radial styloid process for ununited fractures of the carpal scaphoid and the use of intramedullary nails in fractures of the tibia.

The fact that some orthopedists will not accept all of the author's diagnostic criteria and therapeutic methods in no way detracts from the merit of the text. It represents the author's well-founded opinion, and in contradistinction to many authors of orthopedic texts, he does make positive recommendations. It is the latter which renders this book of special value to the young orthopedist, the surgeon who practices orthopedics only occasionally, and the general practitioner. Insofar as senior orthopedists are concerned, the opinion of a practitioner of the caliber of Sir Watson-Jones must be respected.

The book is unusually well organized and indexed; all statements are clearly and concisely made. There are adequate diagrams, photographs, and x-ray reproductions to clarify the subject matter presented. In general, it is considered to be one of the finest orthopedic texts available. —*ERNEST C. LINEBERGER, Lt. Col., MC, USA*

SURGERY OF THE ALIMENTARY TRACT (Bickham-Callander) in three volumes, by *Richard T. Shackelford*, M. D., assisted by *Hammond J. Dugan*, M. D. Volume I: Esophagus, Stomach and Duodenum, Liver, Gallbladder and Extrahepatic Biliary Ducts, pages 1-862; Volume II: Pancreas, Spleen, Small Intestine (Jejunum and Ileum), Peritoneum, Omenta and Mesentery, and Colon, pages 863-1634; Volume III: Anorectal Tract, Excisions of the Rectum, Hernia of the Gastrointestinal Tract, and Incisions, pages 1635-2575. 1,705 illustrations. W. B. Saunders Co., Philadelphia, Pa., 1955. Price $60 for three volumes.

Thirty years ago Dr. Warren Birkham wrote a monumental set of six volumes describing all of the then known surgical procedures, and illustrated them liberally with figures and diagrams. The verbal descriptions were concise and direct without comment or criticism. This

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work enjoyed wide popularity for several generations. In time these volumes were used as library reference books by the curious rather than as informative guides. When subsequent rapid progress in this specialty brought forth a continuing flow of new procedures, improved technics, more efficient anesthesia, and better understanding of etiology, physiology, pathology, and supporting therapeutic measures, revision was urgently needed.

In 1938 Dr. C. Latimer Collander, well known for his *Surgical Anatomy,* undertook this heroic task, but it was halted nine years later by his death. In 1949 Dr. Shackelford agreed to review the manuscripts and complete two volumes on surgery of the alimentary tract. In this undertaking, however, he elected to broaden the scope of his mission considerably. This labor has produced three volumes that bear little resemblance to the original Birkham product. Dr. Shackelford has not revised the older work but rather has written an entirely new set of surgical textbooks that include the anatomy, physiology, and pathology of the alimentary tract, and the clinical findings including diagnostic aids, indications, contraindications, preferences, and limitations for all currently accepted operative procedures on the alimentary tract. The result is an exceedingly comprehensive work of much greater value than the original.

The author states that the comments are based on his own experience and on reports in the literature. He has liberally included some technics of limited use, such as gastric plication and the once popular Murphy button method of intestinal anastomosis, and also mentions kangaroo tendon and Pagenstecher suture material. On the other hand, the bulk of his material covers currently popular procedures in a comprehensive manner. Noteworthy are his straightforward comments on the relative merits of various surgical approaches to a given problem.

These volumes should be of great value to students and surgical residents. They should also be of genuine value as ready reference material to all surgeons, nonspecialists and specialists. They unquestionably will enjoy as long and popular a life as did Dr. Birkham's original volumes. —*JOSEPH R. SHAEFFER, Col., MC, USA*

A TEXTBOOK OF MEDICINE, edited by *Russell L. Cecil,* M. D., Sc. D., *Robert F. Loeb,* M. D., Sc. D., D. Hon. Causa., LL. D., and Associate Editors *Alexander B. Gutman,* M. D., Ph. D., *Walsh McDermott,* M. D., and *Harold G. Wolff,* M. D. 9th edition. 1,786 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

In the preface to this new edition, the editors state their awareness of the necessity for textbooks of medicine to progress with and reflect the many advances in the field of internal medicine during recent years. Moreover, they assert their belief in the importance of combining various physiologic and biochemical aspects of disease processes with clinical descriptions rather than covering these separately. To this end they have succeeded insofar as these aims are practicable in any text of such broad scope.

This edition retains the same basic format of earlier ones with a few minor changes in classification of subject headings. However, extensive changes have been made in the subjects covered, in revision of treatises appearing in the eighth edition, and in the inclusion of new treatises by new contributors.

It adds 39 subjects not included in previous editions. This list encompasses such disease entities and disorders as Coxsackie viral infections, epidemic hemorrhagic fever, leptospiral infections, atherosclerosis, dehydration and fluid balance, portal hypertension, cystic diseases of the lungs, and the painful shoulder—to mention a few of general interest. In addition, extensive revisions of the subject matter in various diseases have been done, particularly from the standpoint of summarizing changes and present-day concepts in the fields of diagnosis, therapeusis, and pathologic physiology. However, as in everything, the changing order in medicine cannot be reflected entirely in such a text, and the critical reader may find already outmoded subject matter in this book. This appears to be an insoluble problem common to all such textbooks.

This edition may be considered a required possession for medical students and a valuable reference text to all physicians practicing clinical medicine. —*WILLIAM G. THALMANN, Jr., Lt. Col., MC, USA*

MODERN NUTRITION IN HEALTH AND DISEASE, DIETOTHERAPY, edited by *Michael G. Wohl,* M. D. and *Robert S. Goodhart,* M. D. 55 contributors. 1,062 pages; 80 illustrations; 127 tables. Lea & Febiger, Philadelphia, Pa., 1955. Price $18.50.

In the rapidly growing field of clinical nutrition there has been a need for an authoritative current textbook covering the wide ramifications of this subject. This new book admirably fills this need.

Written by 55 recognized workers in the field, it encompasses a gamut of topics ranging from the psychology of appetite to oxidative enzymes. The book is amply documented, well indexed, and moderately illustrated.

Almost half the book is devoted to a discussion of the metabolic and physiologic aspects of the various nutrients. The remainder of the book discusses the principles and practice of diet therapy in different clinical states. An admirable feature is that the approach is slanted toward clinical application. There are many tables and diet listings, and two interesting chapters on industrial and emergency feeding.

As might be expected, there is a variation in the quality of some chapters because of multiple authorship. A few sections are merely uncritical résumés of the literature, whereas most discussions present the important information based on the author's experience. In all instances, however, the chapters are complete, detailed, and informative.

The authors and editors should be congratulated on producing a book helpful to all clinicians. —*S. O. WAIFE, Lt. Comdr. (MC) USNR*

DENIAL OF ILLNESS, Symbolic and Physiological Aspects, by *Edwin A. Weinstein,* M. D. and *Robert L. Kahn,* Ph. D. 166 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $4.75.

This monograph concerns the etiology of anosognosia, a term introduced by Babinski to denote the denial or unawareness of left hemiplegia. Current usage broadens its meaning to the denial of other forms of pathologic conditions including amputated limbs, deafness, alexia, and hemiballismus.

The study is multidisciplinary, using a neurologic, psychiatric, anatomic, and psychologic approach. In a series of 52 patients with this syndrome, several distinct patterns of explicit verbal denial are discussed. This is in contrast to a control group of a similar number of patients with comparable brain lesions and disabilities who did not deny their disabilities but who demonstrated other forms of adaptation to them. Significantly, the anosognostic group and the control group displayed different pre-illness personality types. The psychologic studies tended to support the impressions obtained in the study of personality factors. Anatomic and physiologic examination failed to reveal localization.

Appended is extensive data on the clinical, neurologic, pathologic, and behavioral data of both groups. The bibliography is extensive. This well-prepared study should be of interest to neurologists and those in allied fields.—*JOSEPH J. HORNISHER, Col., MC, USA*

PELVO-SPONDYLITIS OSSIFICANS, Rheumatoid or Ankylosing Spondylitis, by *Ragnar Romanus* and *Sven Yden.* 161 pages; illustrated. Year Book Publishers, Chicago, Ill., 1955. Price $8.50.

The classical picture of pelvo-spondylitis ossificans is said to be one of insidious start in the sacro-iliac joint, progressing up the spine with intermittent exacerbations of severe pain, advancing rigidity, frequent impairment in general condition, raised erythrocyte sedimentation rate, anemia, fatigue, and loss of weight, to the final stage of poker back (bamboo spine).

The histologic and roentgenographic studies presented by Drs. Romanus and Yden have afforded evidence that pelvo-spondylitis ossificans should be regarded as a separate entity and not merely a spinal variant of rheumatoid arthritis.

This condition is no curiosity but a relatively common cause of pelvic and low back pain in young and middle-aged men. Therefore, it is important that all physicians should be familiar with the early diagnosis, the course, and the nature of the disease. This book should be of interest to roentgenologists, internists, rheumatologists, and orthopedic and general surgeons as well as general practitioners. The only fault one may find in this book is that the reproduction of the radiograms does not show good detail.—*A. G. M. MARTIN, III, Maj., USAF (MC)*

CLINICAL ORTHOPAEDICS, Number 5, Backache. *Anthony F. DePalma,* Editor-in-Chief. 242 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $7.50.

This is the fifth in a series of journals published twice yearly under Dr. DePalma's editorship. This volume is devoted in 181 of its 231 pages to a consideration of the etiology, differential diagnosis, and treatment of the painful back. Although no epoch-making new discoveries are presented, I believe that the experienced orthopedist will find several helpful points in approach and technic. For the general practitioner it provides a collection of material from many different men and clinics that should be a useful guide for studying this very difficult subject. Conservative therapy is stressed, especially the necessity for overcoming the atonic, lordotic posture of the lumbosacral spine which so frequently underlies chronic disability in this region.

One of the highlights of the book is a biography of Dr. Joel Goldthwait who has played and continues to play such a large part in the development of modern orthopedic knowledge and technics. May these biographical notes be continued in future volumes. The paper by Dr. Austin Moore on the "Multiprop Bone Graft in the Lateral Knee-Chest Position" is one of the most interesting and thought-provoking papers that I have read.

The purpose of this series of books was to provide a means of disseminating the many worthwhile papers that could not be published in the established journals for lack of space. In the present instance, however, I question whether there is need for this publication because five papers have been published elsewhere. I am certain that readers interested in this subject will profit by the book

—*WILLIAM S. STRYKER, Comdr. (MC) USN*

MEDICAL AND PUBLIC HEALTH LABORATORY METHODS. Successor to Fifth Edition of Laboratory Methods of the United States Army. Edited by *James Stevens Simmons,* M. D., Ph. D., Dr. P. H., S. D. (Hon.) and *Cleon J. Gentzkow,* M. D., Ph. D. 1,191 pages; 115 illustrations and 9 plates in color. Lea & Febiger, Philadelphia, Pa., 1955. Price $18.50.

This laboratory book is a comprehensive revision of the previous laboratory methods of the U. S. Army. There are 52 chapters that include special veterinarian methods, public health methodology, and statistical methods in addition to the usual routine laboratory procedures. The figures and plates for the most part are of excellent quality.

The subjects are written by many contributors; this enhances the book's value as a reference for the laboratory worker, but limits it as a manual for the laboratory technician who would become lost in the many complicated procedures.

The sections on bone marrow and blood banking are weak, and some of the typing methods are not in agreement with those of the American

Association of Blood Banks. The section on chemistry is excellent, and the recent works on paper chromatography and flame photometry are included. Unfortunately the slow chemical procedure for plasma fibrinogen is given in the text, but the more recent rapid clinical turbidity methods are not included.

This manual is recommended as a reference book for laboratory workers but not as a laboratory manual for technicians or pathologists.

—*VERNON E. MARTENS, Capt. (MC) USN*

HEARING THERAPY FOR CHILDREN, by *Alice Streng*, M. A., *Waring J. Fitch*, M. A., *LeRoy D. Hedgecock*, Ph. D., *James W. Phillips*, M. D., and *James A. Carrell*, Ph. D. 371 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $6.75.

This is the best publication on diagnosis and treatment of children with hearing disorders I have seen. The authors have neglected no detail of problems associated with the hearing handicapped. The book is well written and organized, and many parts could be put in the hands of parents for a clearer understanding of the problems of hearing impairment.

One of the best features of the book is the division into categories of various stages of hearing loss and a discussion of the differences in educational treatment. The discussion of a hearing conservation program and technics of testing are excellent.

—*JAMES P. ALBRITE, Maj., MC, USA*

PHYSIOLOGY AND ANATOMY, 7th edition, rewritten and reset, by *Esther M. Greisheimer*. 868 pages; 430 illustrations, including 48 in color. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $5.

This text comprises a new and improved approach to the study of anatomy and physiology in which the author has successfully presented a difficult subject in a manner that integrates the subject with nursing practice.

Among the many aids to the student are timely and clear definitions, complete summaries in outline form at the end of each chapter, and sections on "situations and questions" that are thought-provoking and closely related to nursing care. There are 430 illustrations (some in color) throughout the text which serve as excellent teaching aids. Of special interest is the outstanding and complete presentation of the normal physiology of each system and the associated diseases and abnormal conditions that occur in illness.

This text should serve as a guide to the instructor who is teaching an introductory course in anatomy and physiology to nurses. However, the instructor should be aware that the student should previously have had fundamental chemistry in order to comprehend fully some of the material in the text. Students will find this text readable and easy to apply in the practice of preventive medicine and health teaching and in the nursing care of the diseased.—*ANNETTE BAER, Lt. Comdr. (NC) USN*

KINESIOLOGY by *Katharine F. Wells,* Ph. D. 2d edition. 516 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

Those familiar with the first edition of this monograph will, at first glance, believe it to be a reprinting. However, closer examination will disclose that although much of the material has remained the same, much also has been rewritten, with addition of new material and revision of the old. There has been a regrouping of chapters into a more logical sequence in relation to the whole.

The concise classification of joints and muscular systems establishes for the student a sound basis for proceeding into the mechanics and applications of kinesiology. The section on mechanics of human motion describes the principles of the lever, wheel, and pulley as they are used by the human body in producing motion, and discusses principles of motion, force, and work. The author also outlines the basis for the development of motor skills and discusses principles of stability, posture, bodily movement, and receiving and giving of impetus. The section on applications of kinesiology covers the use of kinesiologic principles in ordinary activities such as walking and running, as well as their applications to sports activities and in corrective and conditioning exercises. It also includes gait analysis. Illustrating the book are over 200 excellent photographs and line drawings.

The author's method of presentation makes this book well suited as a text for the teacher and student as well as a valuable volume for others interested in the subject. —*JAMES D. AMOS, Maj., MC, USA*

THE SHOULDER AND ENVIRONS by *James E. Bateman,* M. D., F. R. C. S. (C). Drawings by *Louise Gordon.* 565 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1955. Price $16.25.

This book is the most conscientiously exhaustive work so far dealing with the shoulder and the related adjacent structures. The opening chapter relates to embryology and comparative anatomy. Following this there are two chapters comprising some 60 pages dealing with anatomy and applied physiology which, with their splendid illustrations, are easily the outstanding feature of the book. Approximately 200 pages are devoted to a discussion of differential diagnosis and treatment of over 35 conditions affecting the shoulder and environs. While there is a bit too much repetition and the discussion at times is so detailed that it often confuses, the study is the most painstaking so far published. In the discussion of acute dislocations of the shoulder the author states that "14 to 21 days in a sling" is adequate postreduction immobilization. This is not considered adequate by other surgeons. Under the treatment of recurrent dislocations, mention of the Magnuson procedure, which is one of the most successful, is completely omitted. The final chapter on management and assessment of disability will be helpful to those involved in such evaluation. All in all this is a splendid book. —*WALTER R. MILLER, Capt. (MC) USN*

PSYCHIATRY AND THE LAW, edited by *Paul H. Hock,* M. D. and *Joseph Zubin,* Ph. D. The Proceedings of the Forty-Third Annual Meeting of the American Psychopathological Association, held in New York City, June, 1953. 232 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $5.50.

This book contains 14 papers presented in June 1953 at the 43d annual meeting of the American Psychopathological Association. The program was planned with the hope of promoting deeper understanding and co-operation between lawyers and psychiatrists. Subjects discussed vary from the general topic of "Deviation and Community Sanction" presented by a legal expert to the more specific problem of "Psychodynamic Patterns in the Sex Offender" presented by two psychiatrists.

For this reviewer the point, if any, in several of the papers is concealed in a semantic jungle or lost in platitudes and generalities. Other papers are a mere recitation of the relationship that now exists between the law and psychiatry in certain states and municipalities. A few of the articles concern psychiatric aspects of deviant behavior and will be of interest to psychiatrists, especially in preparing themselves to give testimony as expert witness.

It is hoped that the meeting itself did more to narrow the gap between the legal and the psychiatric appraisal of crime than publication of its proceedings can be expected to do.

—*MARION E. ROUDEBUSH, Capt. (MC) USN*

PROBLEMS OF CONSCIOUSNESS, Transactions of the Fifth Conference, March 22, 23, and 24, 1954, Princeton, N. J. Edited by *Harold A. Abramson,* M. D. 180 pages; illustrated. Sponsored by the Josiah Macy, Jr. Foundation, New York, N. Y., 1955. Price $3.50.

This small volume is a report of the fifth annual conference on the "Problems of Consciousness." The series of conferences was sponsored by the Josiah Macy, Jr. Foundation to promote continuous advance in the field of medicine, and to explore the frontiers of knowledge by effective communication among a group of selected investigators in related professions and specialties.

The aim of the group was to formulate a scientific definition of consciousness. The conference discussions raised many more questions than they answered, and the phenomenon of consciousness remained unsolved. Various viewpoints were presented, including the philosophic, physiologic, and psychologic. The roles of emotions, anxiety, the cerebral cortex, and aesthetics were discussed, together with some interesting research findings to stimulate further study. The transactions are presented in an informal manner, with pertinent verbatim remarks by the various participating members. The book should be of interest to all students and investigators of the phenomenon of consciousness. —*DAVID C. GAEDE, Capt. (MC) USN*

THE MASK OF SANITY, An Attempt to Clarify Some Issues about the So-Called Psychopathic Personality, by *Hervey Cleckley*, M. D. 3d edition. 596 pages. The C. V. Mosby Co., St. Louis, Mo., 1955. Price $9.50.

This edition markedly enlarges on the "Cleckley Psychopath" so vividly described in the first (1940) edition. In the present volume the author has attempted to set off and delineate more clearly other types of personality disorder that may be compared and contrasted with that of the psychopath. The diversity of opinion among different psychiatrists concerning the status of the "psychopath" continues, and no satisfactory means of treating them has evolved because their status in the eyes of the law usually makes it impossible to treat them at all.

Dr. Cleckley's vivid literary style has lost none of its punch in the 20 case presentations in which he graphically portrays the disorder in full clinical manifestation.

Statistics on 857 psychiatric hospital records are included which indicate, according to the author, that more than one fourth of these patients probably represent variations of the type of character inadequacy and personality disorder which is the subject of the book.

Cleckley does not offer any specific treatment as such for these problem patients, but he believes that, if medicolegal agreement could be reached and our present hospital authorities given the ability to hold and deal sensibly with incompetent patients of this sort as they now can with others who are incompetent, a primary and major step would be achieved. He also believes that better results might be obtained if effective control of the situation could be maintained in institutions through well-supervised systems of parole and gradual rehabilitation of those qualifying for outpatient status. He recommends systems of parole, probation, and supervision designed specifically for patients of this type.

This volume is highly recommended not only as a very practical and enlightening book for all practicing physicians, but also for all those who necessarily must become involved both medically and legally with these definitely disabled persons who at present are continually being shunted between jails and closed wards wearing their "mask of sanity."

—*PHILLIP B. SMITH, Lt. Col., MC, USA*

DIFFERENTIAL DIAGNOSIS OF LEUKOPLAKIA, LEUKOKERATOSIS AND CANCER IN THE MOUTH, by *Ashton L. Welsh*, M. D. 62 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $2.50.

This 62-page monograph devoted to a description of the intraoral lesions listed in the title, and others which simulate them, is written by a dermatologist. The author considers leukoplakia to be an early manifestation of the response of the mucous membranes of the mouth to "chronic inflammation from irritation." Leukokeratosis is considered to be a more advanced reaction, consisting of a defense response. He

describes it as follows ". . . a call of alarm, a more clamorous petition, a summons for battle and hardening of the mucous membranes of the body." Carcinoma is the final result of irritation which has been ignored and untreated. The description of the gross and microscopic appearance of these lesions is presented. A strong appeal is made for thorough examination of the mouth, removal of irritation, and oral hygiene.

The use of this book by dental students, dentists, or physicians and surgeons interested in diseases of the oral cavity is not considered mandatory. —*ROALD N. GRANT, Capt. (MC) USN*

INDUSTRY AND TROPICAL HEALTH II, Proceedings of the Second Conference, Industrial Council for Tropical Health. Sponsored by The Harvard School of Public Health, April 20-22, 1954, in New York and Boston. 266 pages; illustrated. Published for The Industrial Council for Tropical Health by The Harvard School of Public Health, Boston, Mass., 1955. Price $10 (Professional Rate $5).

This book consists of a series of formal papers and discussions, by recognized experts in the field of tropical health, of the major problems associated with the establishment of medical services by industry engaged in operations in the tropics. The expansion of industrial medical activities in these areas from the early concept of prevention of mass infection and treatment of accidental casualties among workers to our present comprehensive preventive medicine programs is brought out by discussions of the programs instituted by various companies. The need for a closer look as to just how far one should go with such programs is likewise considered.

The papers presented in this volume may be considered in three broad groupings. One group concerns such strictly medical subjects as recent developments in the fields of poliomyelitis, amebiasis, malaria, tuberculosis, and trachoma, and their application to industrial medical operations in the tropics. Another series, dealing with the broader aspects of preventive medicine, ranges from accident prevention, the effects of environment and nutrition on personnel, and problems of health education associated with language, educational, and cultural differences, to a consideration of the influences exerted by the habits, rituals, and religions of the areas on the initiation, scope, and administration of public health programs. The third series of papers is concerned with an evaluation of the medical requirements and responsibilities of industry abroad as regards both foreign and indigenous personnel, and with discussions of the importance of adequate screening of personnel, including dependent family members, prior to assignment to tropical areas.

This volume contains a great deal of valuable information relative to industrial preventive medicine activities in tropical regions, particularly as regards the administration of preventive medicine programs. It is recommended for those persons concerned with planning and administration of public health programs, regardless of location.

—*THOMAS B. DUNNE, Capt., MC, USA*

SYMPOSIUM ON ATHEROSCLEROSIS, Held under the Auspices of The Division of Medical Sciences, National Academy of Sciences, National Research Council, at the request of The Human Factors Division, Air Force Directorate of Research and Development, 22-23 March 1954. Publication 338. 249 pages; illustrated. National Academy of Sciences, National Research Council, Washington 25, D. C., 1954. Price $2.

Current research in atherosclerosis, and particularly in lipoprotein metabolism, is so active that there is a great need for a summary which will orient the reader through the bewildering maze of new observations. The reports in this monograph are the best available for this purpose. An outstanding group of research workers, representing multiple disciplines, met for a symposium sponsored by The Division of Medical Sciences, National Academy of Sciences, National Research Council, at the request of The Human Factors Division, Air Force Directorate of Research and Development.

There are 23 papers on topics ranging from hereditary factors to dietary relationships, and from biophysics to endocrinology. All are stimulating, serious studies of a disorder of tremendous importance. A particularly valuable feature is a recapitulation and synthesis after each of the five sections of the symposium.

Most of the presentations deal with the "basic science" aspects of atherosclerosis and lipoproteins, while certain clinical features (diet and hormones) are ably presented by Stare, Mann, Keys, Katz, Stamler, and others.

Any physician who is seriously interested in atherosclerosis should not be without this authoritative review.

—*S. O. WAIFE, Lt. Comdr., MC, USNR*

DEXTRAN, Its Properties and Use in Medicine, by *John R. Squire*, M. D., F. R. C. P.; *J. P. Bull*, M. D.; *W. d'a Maycock*, M. D.; and *C. R. Ricketts*, Ph. D., F. R. I. C. 91 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955.

This book is an up-to-date monograph on the properties of and clinical experiences with dextran. Accurately and well written by three British workers who have had considerable experience for several years in the study of plasma volume expanders, it includes a good review of the literature that is brought into all the discussions. The book is primarily concerned with the behavior of plasma volume expanders and, specifically, the effect of infusions of dextran physiologically and chemically. There is a good dissertation on specification of dextran and a short chapter on its clinical uses.

The book is easy to read and should prove very beneficial to the clinician who would like to have a brief review of the present status of the use of dextran. It should be of particular value to research workers who are carrying out investigations in the field of plasma volume expanders. —*CURTIS P. ARTZ, Lt. Col., MC, USA*

TRANSPLANTATION OF TISSUES, Cartilage, Bone, Fascia, Tendon, and Muscle, by *Lyndon A. Peer,* M. D. Volume I. 421 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., 1955. Price $13.50.

This volume is the first comprehensive review of the subject of transplantation of tissue in 30 years. In volume 1, the author has taken up the transplantation of cartilage, bone, fascia, tendon, and muscle; the proposed second volume is to cover transplants of skin, fat, nerve, teeth, mucous membrane, cornea, lens, cancer cells, and whole organs.

In the present volume, one portion is largely devoted to a briefing on the morphology and physiology of the human tissue cell. There is a discussion on the influence of transplantation on tissue cells; then each individual tissue is taken up separately. A chapter is devoted to a presentation of the cell replacement theory versus the cell survival theory, with the author strongly favoring the cell survival theory.

One is impressed with the thoroughness with which the author has discharged a difficult task. The voluminous literature on the subject of transplantation has been read, considered, analyzed, and evaluated. The substantial facts have been crystallized from amidst a maze of oft-times conflicting and confusing reports. Impressive as is this accomplishment, even more so is the great amount of investigative work carried out at the clinical level by the author, that, as he states, is difficult ". . . because patients have an understandable disinclination to be experimented upon . . . ."

To those familiar with the author's many past contributions to medical literature, it will come as no surprise that this is an excellent book, for it carries on in his thorough style. The subject is covered from both a research and clinical standpoint. To many readers, the analysis of the literature that covers many pages will be tedious, but is necessary for completeness and can be omitted by the casual reader. Where controversy exists, the author carefully states both sides and never overstates his case in defending his own choice. Both the clinician and the research physician will find this book a valuable tool.

—*JOSEPH R. CONNELLY, Comdr. (MC) USN*

TEXTBOOK OF HEALTHFUL LIVING, by *Harold S. Diehl,* M. A., M. D., Sc. D. 5th edition. 802 pages; illustrated. McGraw-Hill Book Co., Inc., New York, N. Y., 1955. Price $6.

This fifth edition of this book does an excellent job of supplying the need for a good text on personal hygiene. It is written in terms the average high school graduate can understand, yet contains useful information for the nurse, doctor, and public health worker.

The present edition has been expanded to cover many subjects not presented in former editions. The author states that this book is for use as a college text on personal hygiene, and in this respect he has done a splendid job in presenting the subject. The illustrations are adequate. References cover the field from popular magazines to scientific journals and books, with emphasis on health pamphlets.

In an attempt to make the book easy to read, much extraneous material has been added which distracts from the completeness of some subjects. For example, 12 pages concern "fresh air," yet the reader is left without an answer to such simple questions as: Should you sleep with windows open? and Is room air-conditioning good or bad for your health?

The subject of venereal disease, which is certain to attract much attention from college students, is covered in a few broad statements. These statements are meaningless and worthless as far as personal hygiene is concerned.

It is unfortunate that such a fine text had to include a scientific appendix (Appendix D) difficult for even most young physicians to understand. On pages 480 to 483, the author decries self-diagnosis and treatment; yet as an appendix he includes an official scientific report of the American Public Health Association entitled, "Control of Communicable Diseases in Man," which gives diagnosis as well as treatment.

In spite of its many shortcomings, this is probably one of the most complete textbooks devoted to personal hygiene available. It is easy to read, contains much useful information for teachers and students, and is a valuable contribution to the health worker's library.

—*THOMAS G. FAISON, Col., MC, USA*

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 61, Art. 3, Pages 637-736, July 8, 1955. Editor: *Roy Waldo Miner.* "Bioflavonoids and the Capillary." Conference Co-Chairmen: *Gustav J. Martin* and *Albert Szent-Györgyi.* Consulting Editor: *Gustav J. Martin.* 98 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1955. Price $3.

Bioflavonoids comprise a group of biologically active pigments, of which rutin and hesperidin are perhaps most commonly known. Their biologic activities are reported to include: estrogenic effect; reduction of fragility and permeability of the walls of capillaries and venules; the sparing of ascorbic acid; and certain therapeutic effects in hemorrhagic conditions, rheumatic fever, and poliomyelitis.

Assembled in this booklet are 13 discussions resulting from a conference on the subject. The papers are grouped under "Laboratory Studies" and "Clinical Studies." The chemistry and biogenesis of the flavonoids are described in Part 1, which also contains excellent reports on experimental studies of the structure and function of the capillaries and venules; less appropriately grouped as a laboratory study is a discussion of the reduction of hazards in long-term anticoagulant therapy by use of ascorbic acid in combination with bioflavonoids.

Among the clinical studies, the reduction of pneumonic and rheumatic complications of streptococcic infection and the rapid subsidence of symptoms of rheumatic fever were cited as resulting from ascorbic acid-bioflavonoid therapy. The rationale was based on the demonstration

of capillary lesions in patients without this therapy, and the prevention of the hyaluronidase effect in the pericapillary tissues in animals fortified with bioflavonoids. Decidual bleeding in pregnancy and habitual abortion were also greatly reduced by ascorbic acid-bioflavonoid treatment. Finally, a quantitative but nonspecific antiviral effect in poliomyelitis was described as resulting from this combined medication. Although the mechanism of action of this group of compounds was not fully expounded, Szent-Györgyi, in concluding, stated: "Flavonoids represent one of the most exciting, broad, and hopeful fields of biological inquiry."

This compilation of studies cannot be expected to leave the reader with as concise or complete a conclusion as would the work of one author. It is, nevertheless, informative, readable, and possibly even exciting.—*ROBERT L. CAVENAUGH, Lt. Col., MC, USA*

ORAL AND DENTAL DIAGNOSIS With Suggestions for Treatment, by *Kurt H. Thoma,* D. M. D., and *Hamilton B. G. Robinson,* D. D. S., M. S. 4th edition. 449 pages; 928 illustrations; 55 in color. W. B. Saunders Co., Philadelphia, Pa., 1955.

This compact revised edition of a popular dental text has been completely reorganized. Part 1 stresses the responsibilities of the modern dentist if he is to render a health service commensurate with that of today's medicine and surgery. The time and methods of using current examination and laboratory technics as adjuncts in establishing chairside diagnoses are discussed in detail.

In part 2 specific data are presented on the etiology, histology, pathology, and symptomatology of dento-oral lesions and anomalies. The need for recognition of the normal tissue appearance and the necessity for early treatment planning for the prevention or extension of disease is emphasized.

The systematic format of the new edition has eliminated the need for multiple cross-reference work on the part of the reader. Lesions and abnormalities are considered in relationship to the anatomic areas of their appearance; this follows the logical sequence of the previously prescribed examination procedures. The bibliography is impressive and detailed. References to authors whose works have been considered stimulating should inspire further reading.

The book is generously illustrated. Several of the new color plates are outstanding in quality. A novel feature of the illustrative technic is the depiction of many atypical clinical manifestations of oral disease. This is a marked improvement over the customary stereotyped portrayals of classic pathologic entities.

These authors have produced an effective clinical diagnostic aid for the dental student and a convenient reference volume for the busy general practitioner.—*ROBERT L. COOMBS, Lt. Col., USAF (DC)*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

PSYCHIATRIC RESEARCH REPORTS 1, of the American Psychiatric Association. Edited by Members of the Committee on Research, 1954-55, *Jacques S. Gottlieb*, M. D., Chairman, *Nathan S. Kline*, M. D., *William T. Lhamon*, M. D., *Albert E. Moll*, M. D., *Harold E. Himwich*, M. D., *George Saslow*, M. D. "Pharmacologic Products Recently Introduced in the Treatment of Psychiatric Disorders." Papers presented at a Regional Research Conference Held Under the Joint Auspices of the American Psychiatric Association and the University of Texas Medical Branch, Galveston, Tex., February 18-19, 1955. General Chairman: *Titus H. Harris*, M. D. Chairman of Scientific Program: *Martin L. Towler*, M. D. Consultant Editor, This Number: *William T. Lhamon*, M. D. Editorial Assistant: *Marion Robinson*, B. S. 152 pages; illustrated. Published by American Psychiatric Association, Washington 6, D. C., July 1955. Price $2.

PSYCHIATRIC RESEARCH REPORTS 2, of the American Psychiatric Association. Edited by Members of the Committee on Research, 1953-54, *Jacques S. Gottlieb*, M. D., Chairman, *Nathan S. Kline*, M. D., *William T. Lhamon*, M. D., *Albert E. Moll*, M. D., *Harold E. Himwich*, M. D., *George Saslow*, M. D. "Approaches to the Study of Human Personality." Papers presented at a Regional Research Conference Held Under the Joint Auspices of the American Psychiatric Association and the Department of Psychiatry of the Graduate School of the National University of Mexico at Facultad de Medicina, Mexico, D. F., March 11-13, 1954. General Chairman: *Alfonso Millan*, M. D. Chairman of Scientific Program: *Rogelio Diaz-Guerrero*, M. D. Consultant Editor, This Number: *Nathan S. Kline*, M. D. Editorial Assistant: *Marion Robinson*, B. S. 176 pages. Published by the American Psychiatric Association, Washington 6, D. C., December 1955. Price $2.

SYMPOSIUM ON ATHEROSCLEROSIS, Held under the Auspices of The Division of Medical Sciences, National Academy of Sciences, National Research Council, at the request of The Human Factors Division, Air Force Directorate of Research and Development, 22-23 March 1954. Publication 338. 249 pages; illustrated. National Academy of Sciences, National Research Council, Washington 25, D. C., 1954. Price $2.

Christopher's TEXTBOOK OF SURGERY, edited by *Loyal Davis*, M. D. 6th edition. 1,484 pages; 1,359 illustrations on 716 figures. W. B. Saunders Co., Philadelphia, Pa., 1956.

PATHOLOGIC PHYSIOLOGY, Mechanisms of Disease, edited by *William A. Sodeman*, M. D., F. A. C. P. 2d edition. 963 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1956.

METHODS AND MATERIALS IN RECREATION LEADERSHIP, by *Marybelen Vannier*, Ed. D. Illustrated by *William Osburn*. 288 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1956.

IMMUNOLOGY AND SEROLOGY, by *Philip L. Carpenter.* 351 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1956.

THE VERTEBRATE BODY, A Shorter Version of the Second Edition, by *Alfred Sherwood Romer.* 486 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1956.

THE YEAR BOOK OF DRUG THERAPY (1955-1956 Year Book Series), edited by *Harry Beckman,* M. D. 560 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price $6.

HISTORY OF THE SECOND WORLD WAR, United Kingdom Medical Series. Editor-in-Chief, Sir *Arthur S. MacNalty,* K. C. B., M. D., F. R. C. P., F. R. C. S. THE ROYAL AIR FORCE MEDICAL SERVICES, edited by Squadron Leader *S. C. Rexford-Welch,* M. A., M. R. C. S., L. R. C. P., R. A. F. Volume II, Commands. 695 pages; 54 plates and 51 maps, diagrams and figures. Published by Her Majesty's Stationery Office, London, E. C. 1, 1955. To be purchased from York House, Kingsway, London, W. C. 2. Price 75s. net ($13.50).

SYMPOSIUM ON MYASTHENIA GRAVIS. Papers read at the First International Conference on Myasthenia Gravis, at Philadelphia, Pa., on December 8-9, 1954, under auspices of The Myasthenia Gravis Foundation, Inc., New York. *Henry R. Viets,* M. D., and *George D. Gammon,* M. D., Guest Editors. 742 pages; illustrated. Distributed by The Myasthenia Gravis Foundation, Inc., New York, N. Y., 1955.

INTRODUCTION TO HEPATIC SURGERY, by *Henry Gans,* M. D., with an introduction by *A. Brunschwig,* M. D. 292 pages; 120 illustrations. Elsevier Press, Inc., Houston, Tex., 1955. Price $12.

APPLIED ORTHODONTICS, by *James David McCoy,* M. S., D. D. S., F. A. C. D., in collaboration with *Earl Emanuel Shepard,* D. D. S., F. A. C. D. 7th edition. 336 pages; 212 illustrations and 9 plates. Lea & Febiger, Philadelphia, Pa., 1956. Price $7.50.

ATLAS OF PLASTER CAST TECHNIQUES, by *E. E. Bleck,* M. D., *Nellie Duckworth,* and *Nancy Hunter.* 128 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price $4.75.

EPITOME of the Pharmacopeia of the United States and the National Formulary with Comments. Issued under the Direction and Supervision of the Council on Pharmacy and Chemistry of the American Medical Association. 10th edition. 322 pages. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $3.

BIOCHEMISTRY FOR MEDICAL STUDENTS, by *William Veale Thorpe,* M. A. (Cantab.) Ph. D. (Lond.) 6th edition. 542 pages; 48 illustrations. J. B. Lippincott Co., Philadelphia, Pa., 1956. Price $6.75.

DISEASES OF THE LIVER, edited by *Leon Schiff,* M. D., Ph. D., with the collaboration of 27 contributors. Foreword by *Cecil J. Watson,* M. D., Ph. D. 738 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1956. Price $16.

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